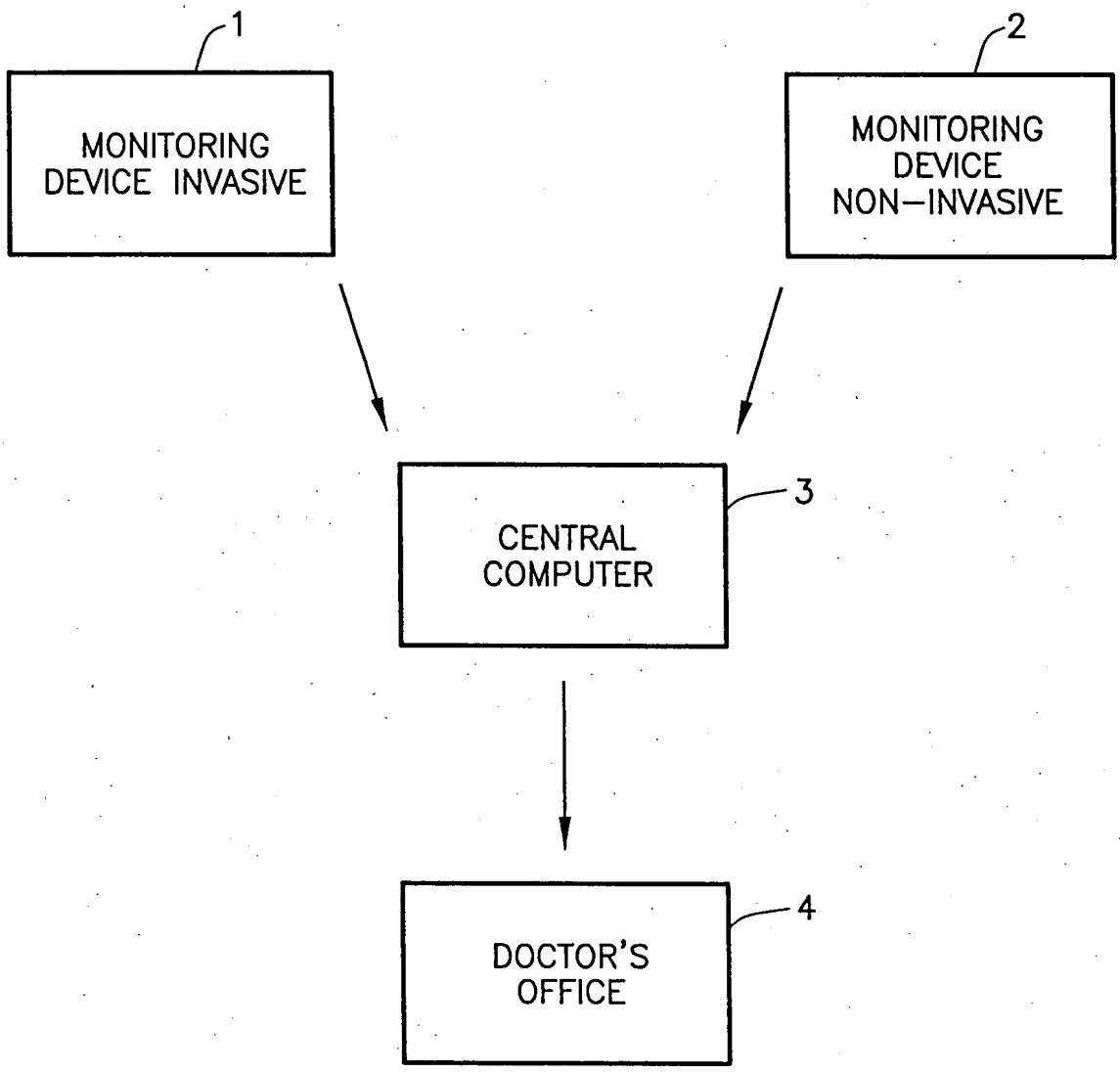
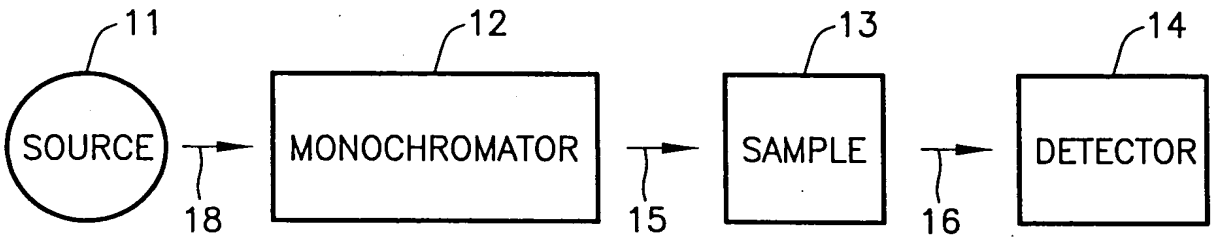
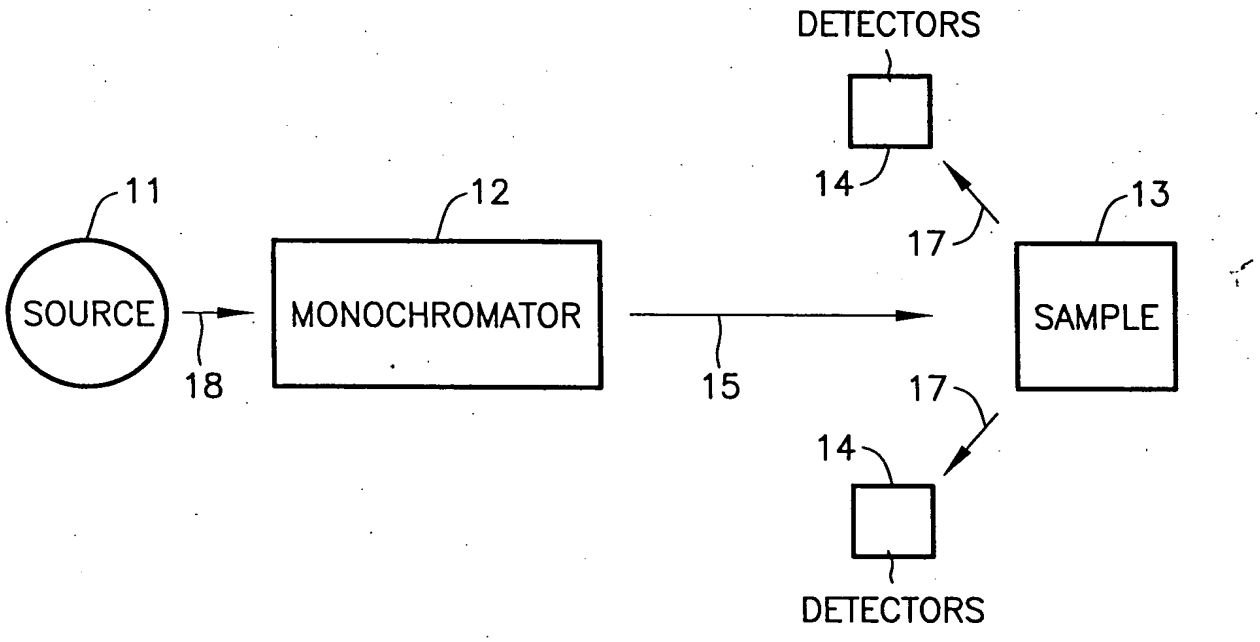


Fig. 1



NEAR-INFARED TRANSMITTANCE (NIT)

Fig. 2A



NEAR-INFARED TRANSMITTANCE (NIR)

Fig. 2B

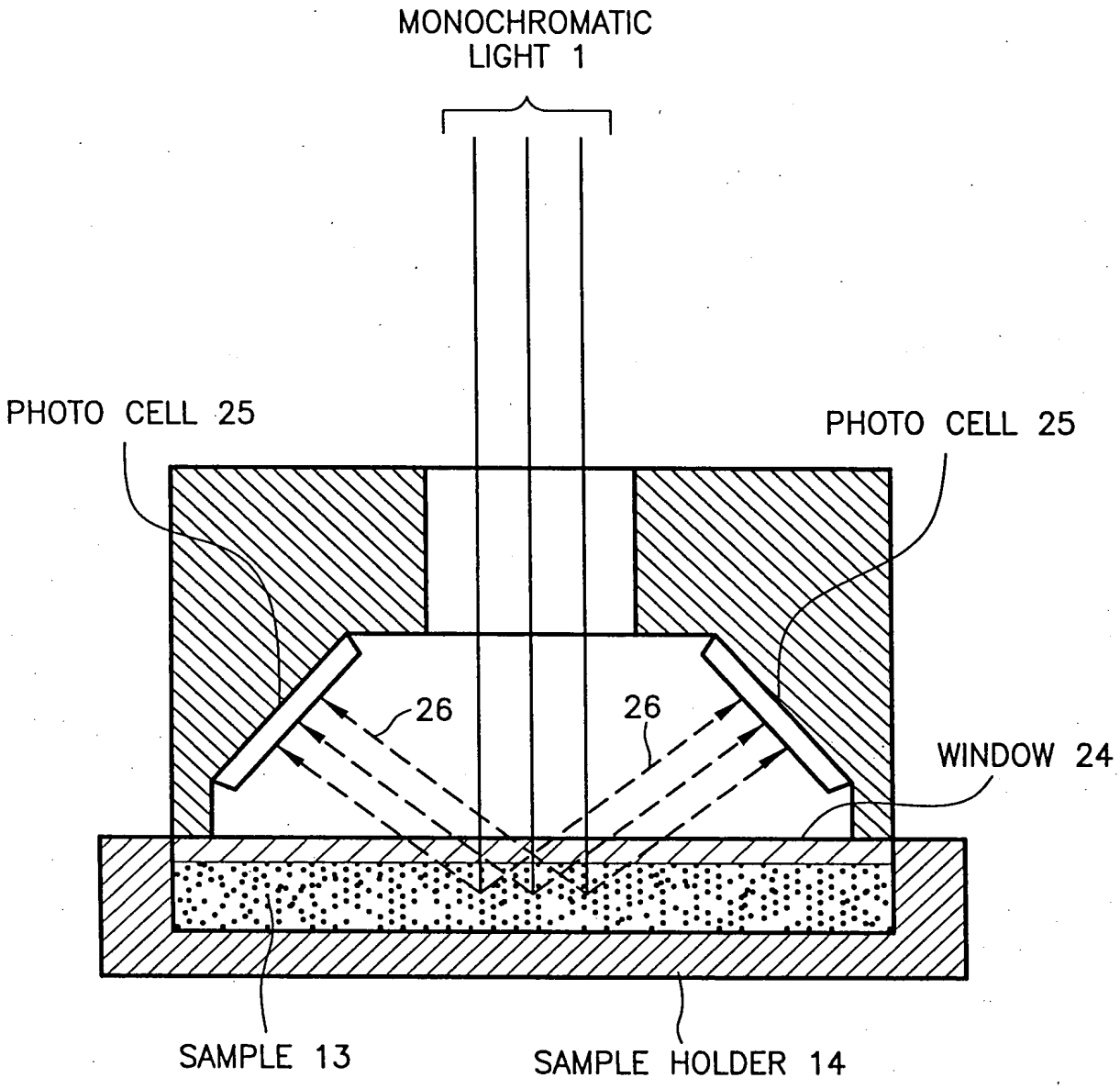

MONOCHROMATIC
LIGHT 1
PHOTO CELL 25
PHOTO CELL 25
26
26
WINDOW 24
SAMPLE 13
SAMPLE HOLDER 14

Fig. 3

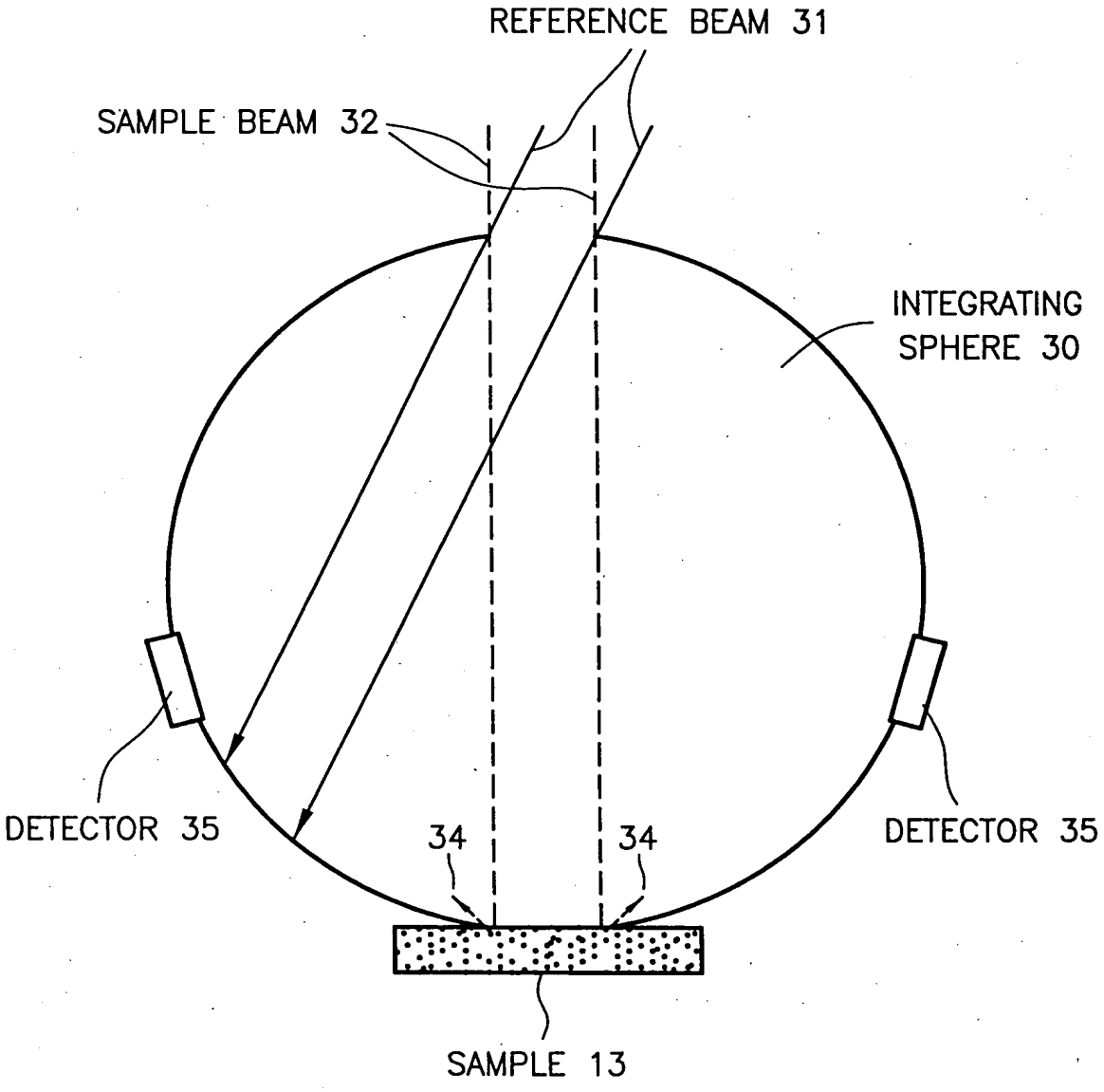

REFERENCE BEAM 31
SAMPLE BEAM 32
INTEGRATING SPHERE 30
DETECTOR 35
DETECTOR 35
34
34
SAMPLE 13

Fig. 4

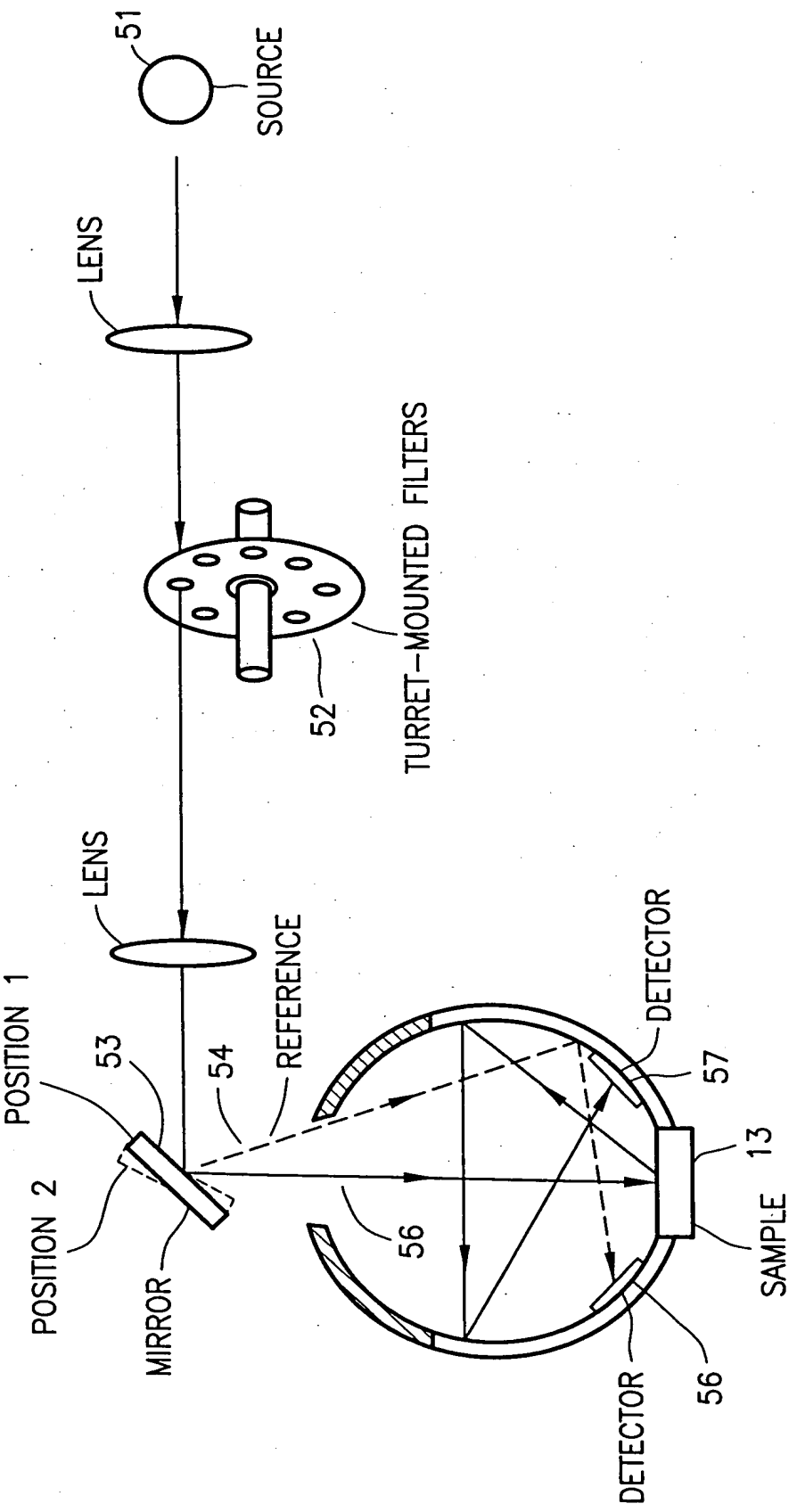

51
SOURCE
LENS
TURRET-MOUNTED FILTERS
52
LENS
POSITION 1
53
54
REFERENCE
DETECTOR
57
13
POSITION 2
MIRROR
56
SAMPLE
DETECTOR
56

Fig. 5

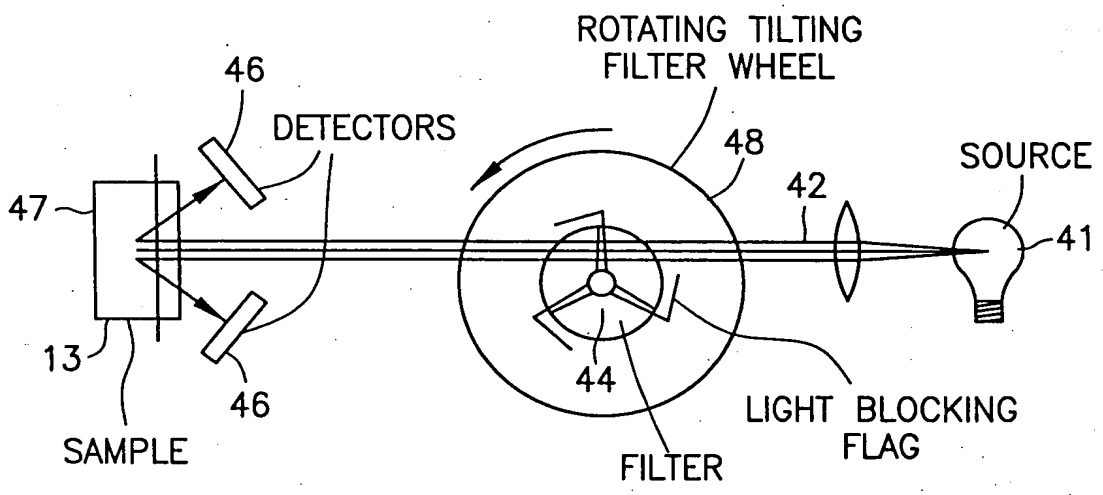

ROTATING TILTING
FILTER WHEEL
46
DETECTORS
48
SOURCE
47
42
41
13
44
46
LIGHT BLOCKING
FLAG
SAMPLE
FILTER

Fig. 6

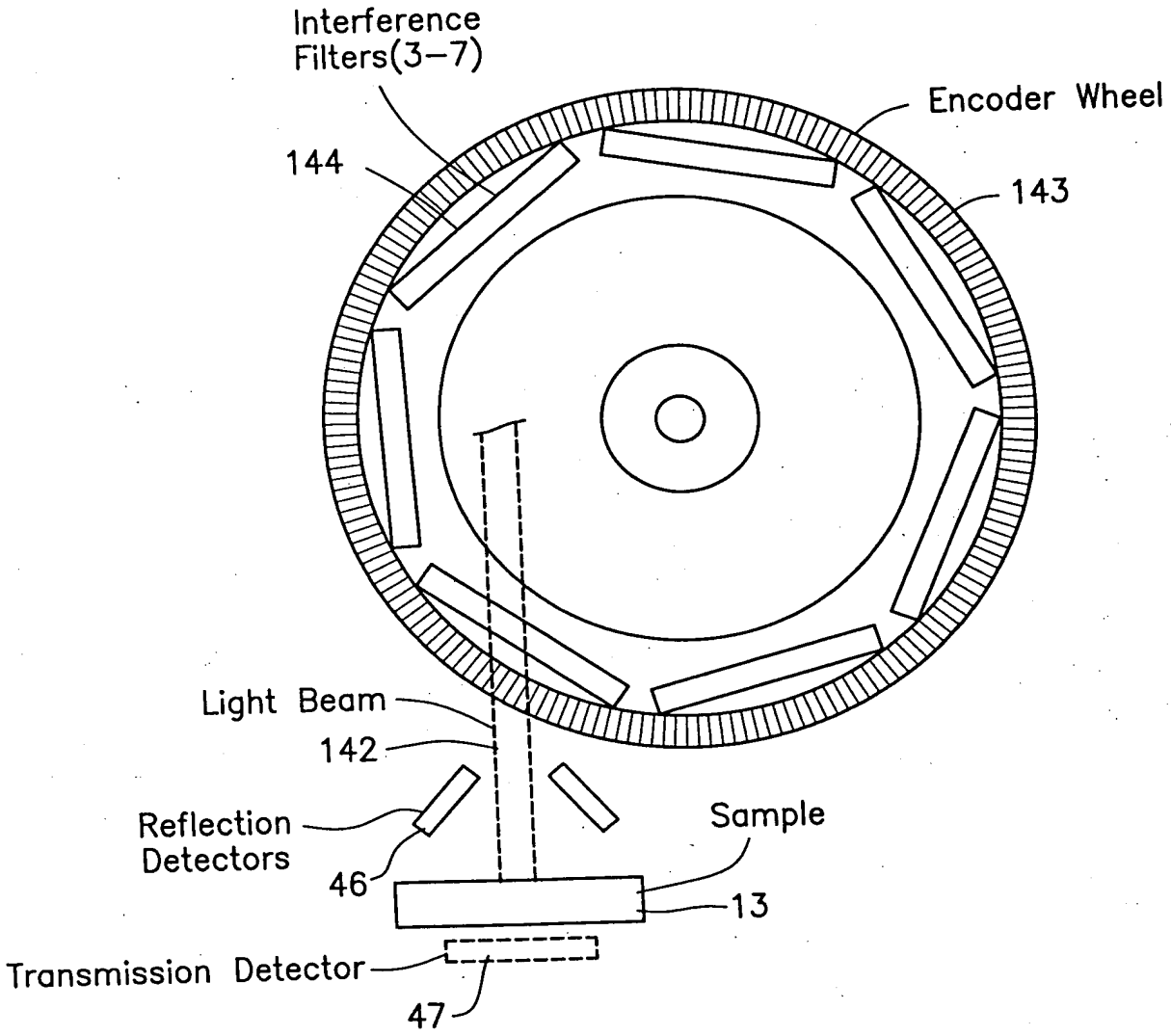

Interference
Filters(3–7)
144
Encoder Wheel
143
Light Beam
142
Reflection
Detectors
46
Sample
13
Transmission Detector
47

Fig. 7

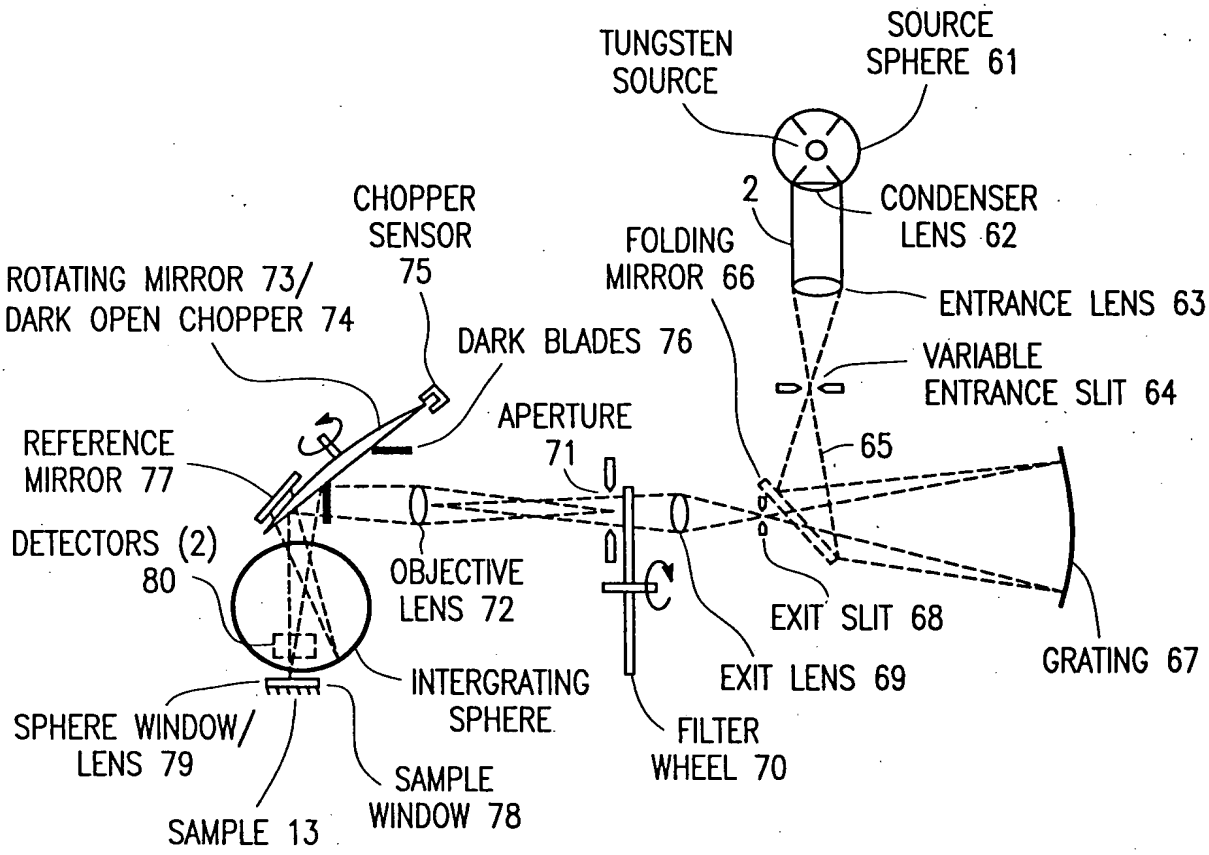

TUNGSTEN SOURCE
SOURCE SPHERE 61
2
CONDENSER LENS 62
CHOPPER SENSOR 75
FOLDING MIRROR 66
ENTRANCE LENS 63
ROTATING MIRROR 73/ DARK OPEN CHOPPER 74
DARK BLADES 76
VARIABLE ENTRANCE SLIT 64
APERTURE 71
65
REFERENCE MIRROR 77
DETECTORS (2) 80
OBJECTIVE LENS 72
EXIT SLIT 68
GRATING 67
INTERGRATING SPHERE
EXIT LENS 69
SPHERE WINDOW/ LENS 79
FILTER WHEEL 70
SAMPLE WINDOW 78
SAMPLE 13

Fig. 8A

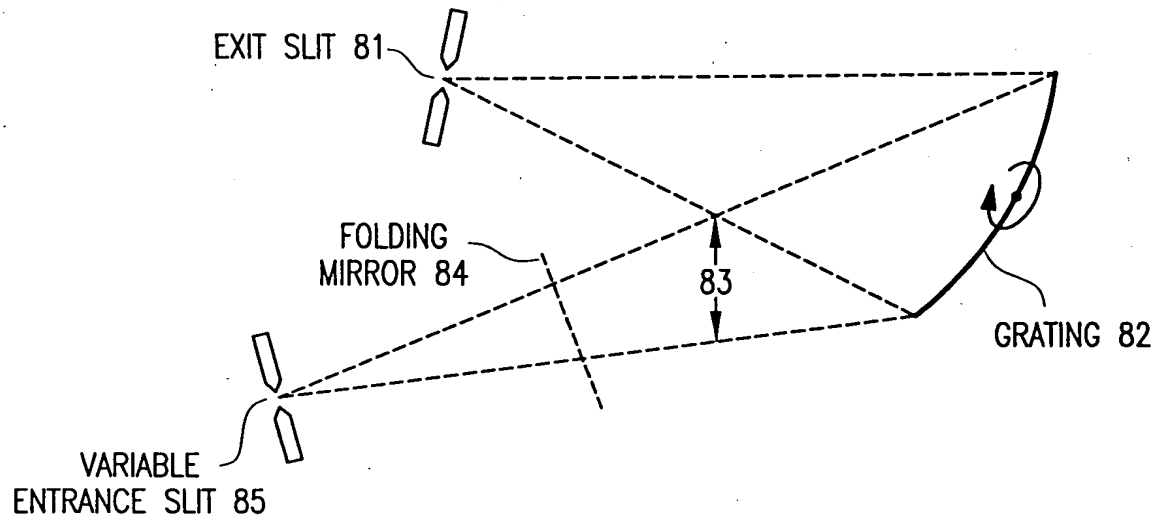

EXIT SLIT 81
FOLDING MIRROR 84
83
GRATING 82
VARIABLE ENTRANCE SLIT 85

Fig. 8B

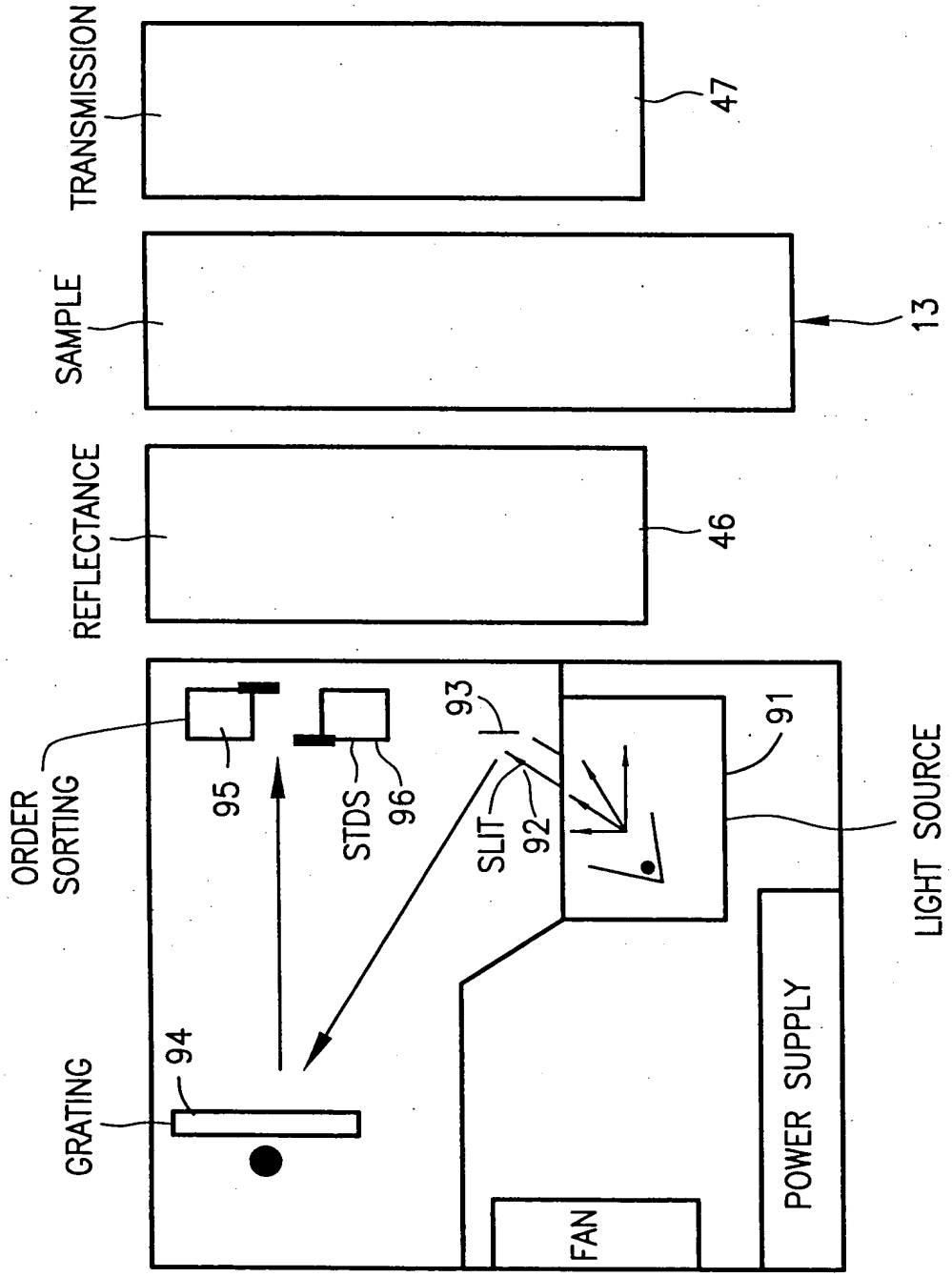

TRANSMISSION
47
SAMPLE
13
REFLECTANCE
46
ORDER SORTING
95
STDS
96
93
SLIT
92
91
LIGHT SOURCE
GRATING
94
FAN
POWER SUPPLY

Fig. 9

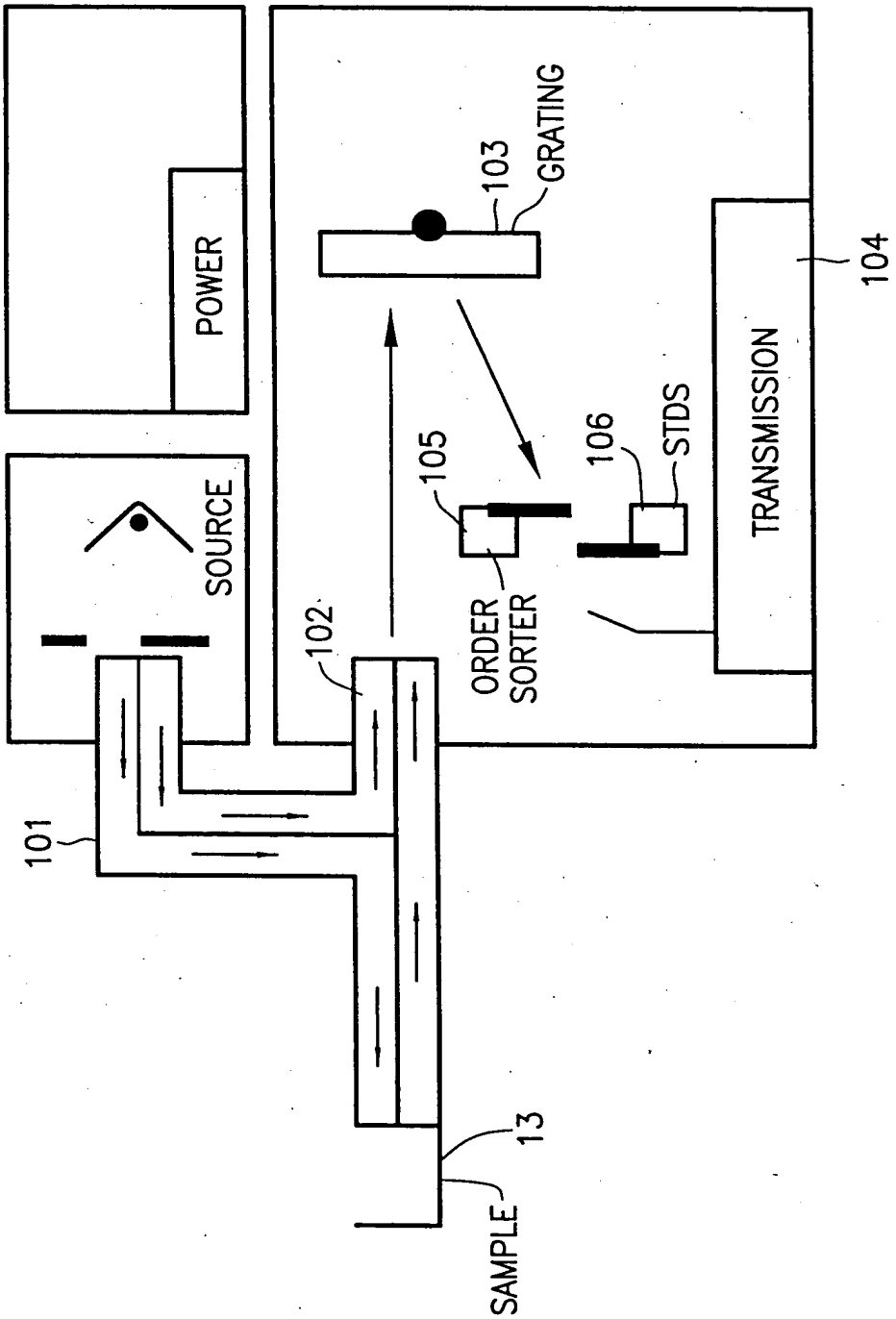

POWER
SOURCE
101
102
103
GRATING
104
TRANSMISSION
105
ORDER SORTER
106
STDS
13
SAMPLE

Fig. 10

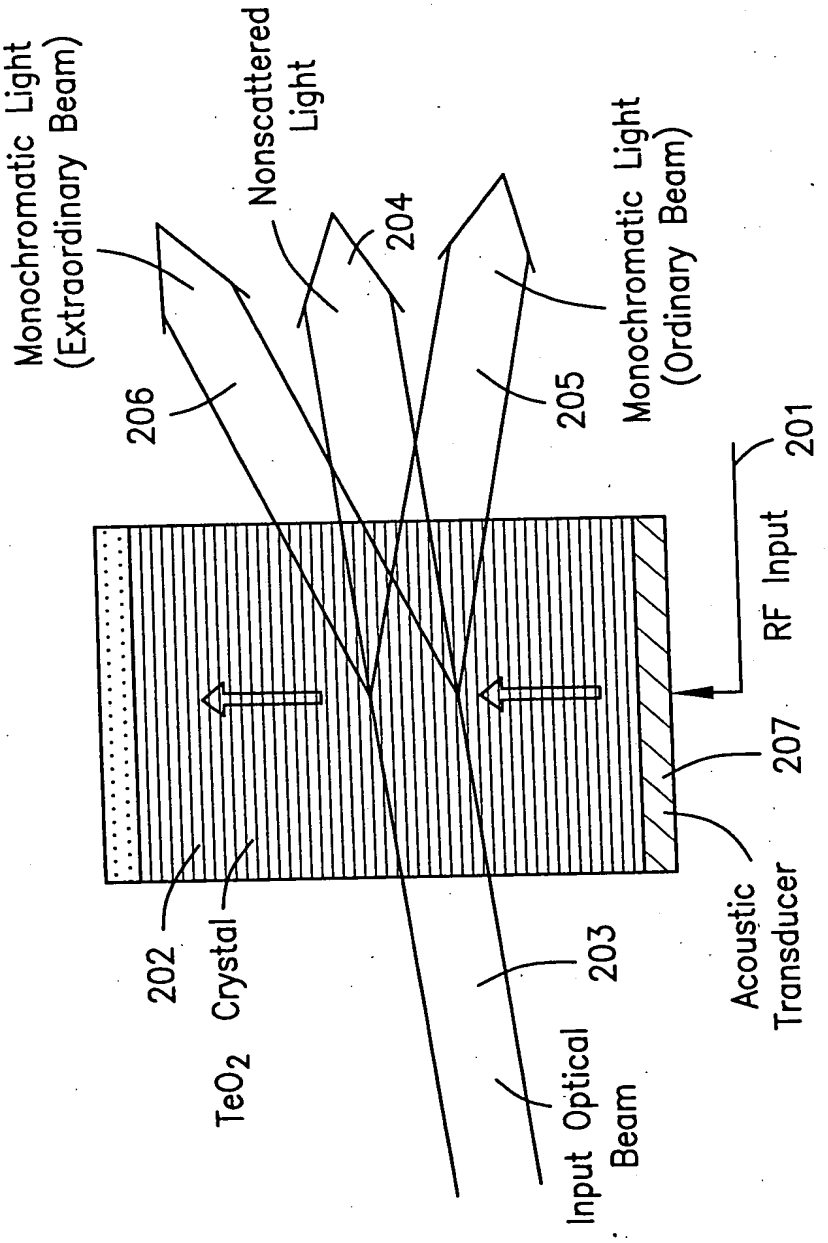

Monochromatic Light
(Extraordinary Beam)
Nonscattered
Light
204
Monochromatic Light
(Ordinary Beam)
206
205
201
RF Input
207
202
Crystal
TeO_2
203
Input Optical
Beam
Acoustic
Transducer

Fig. 11

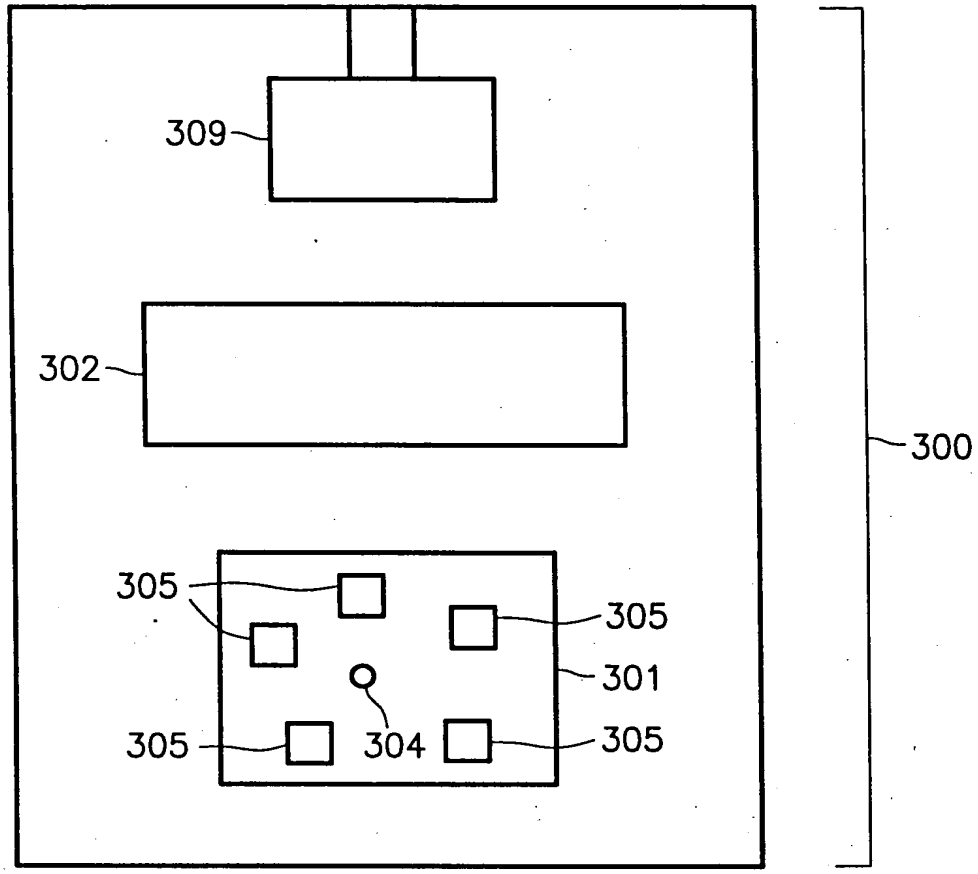


Fig. 12A

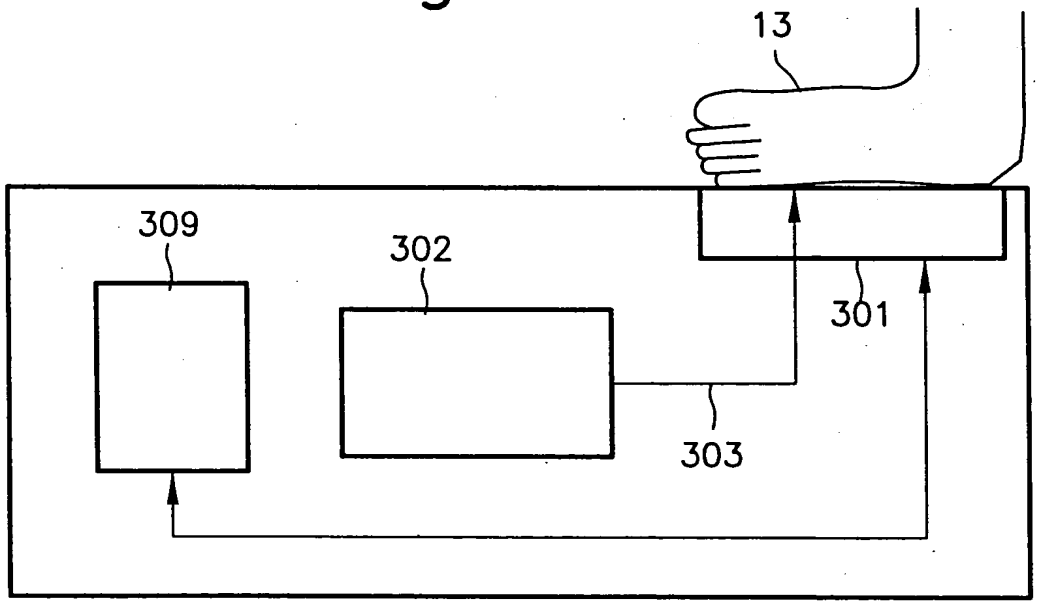


Fig. 12B

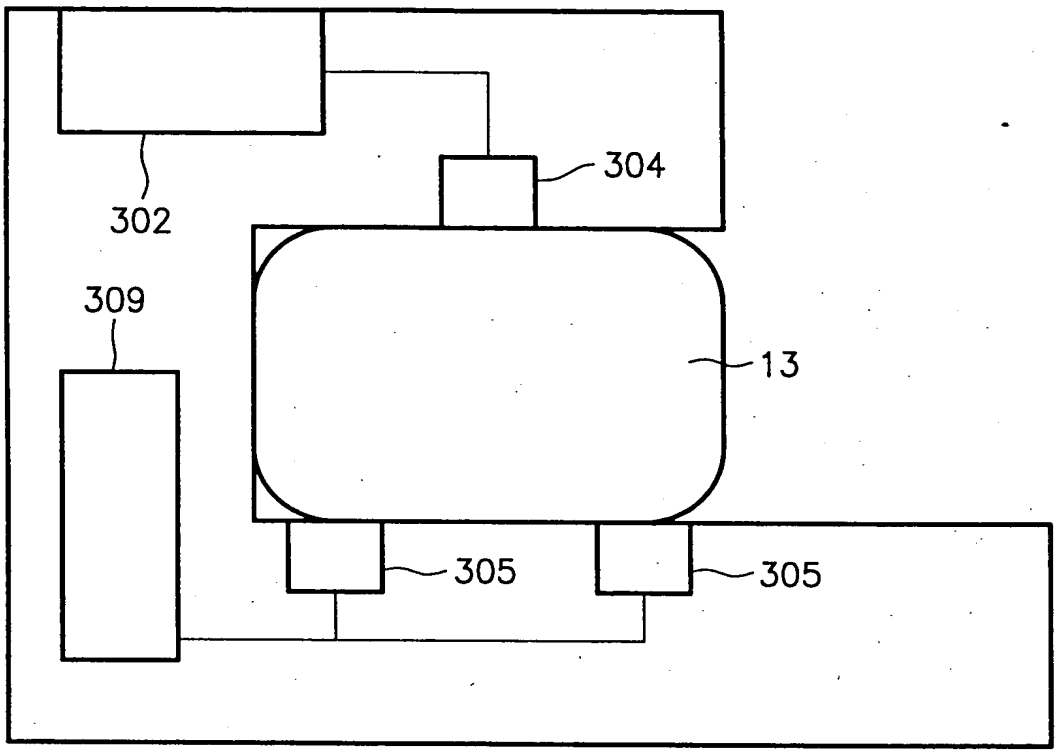


Fig. 12C

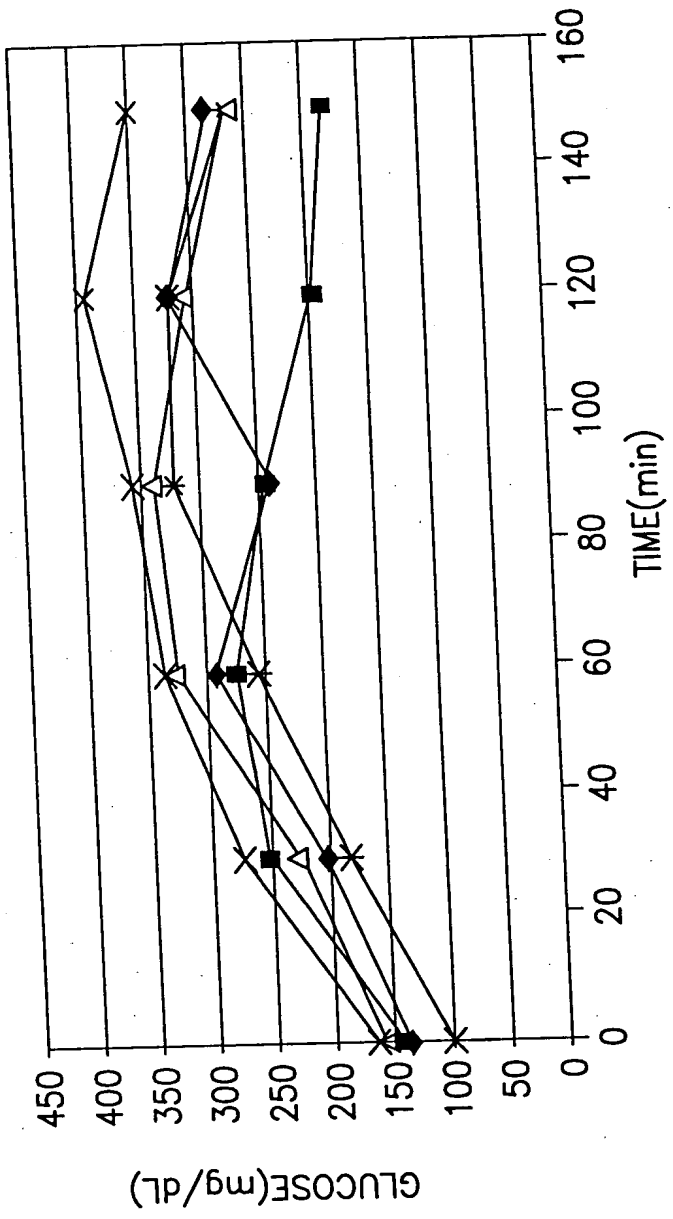

GLUCOSE(mg/dL)
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
160
TIME(min)
12/15/1999
12/22/1999
01/05/2000
01/12/2000
01/19/2000

Fig. 13A

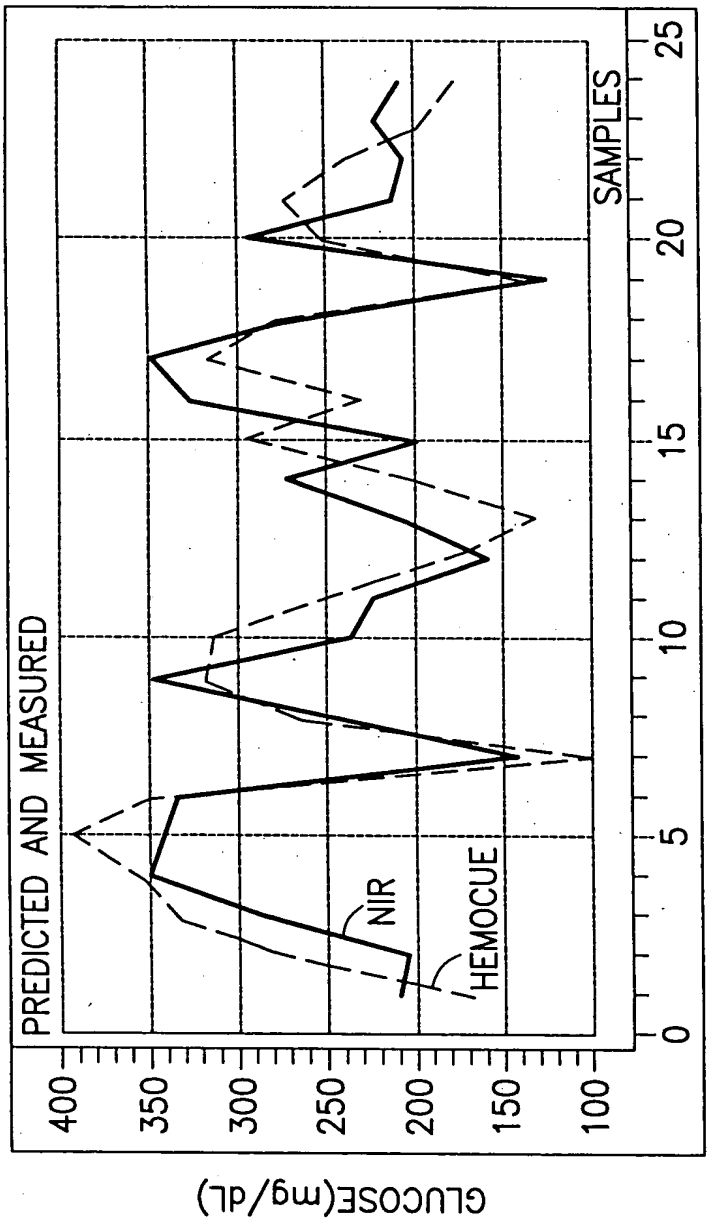

PREDICTED AND MEASURED
GLUCOSE(mg/dL)
400
350
300
250
200
150
100
0
5
10
15
20
25
SAMPLES
SAMPLE NUMBER (6 PER WEEK)
NIR
HEMOCUE

Fig. 13B

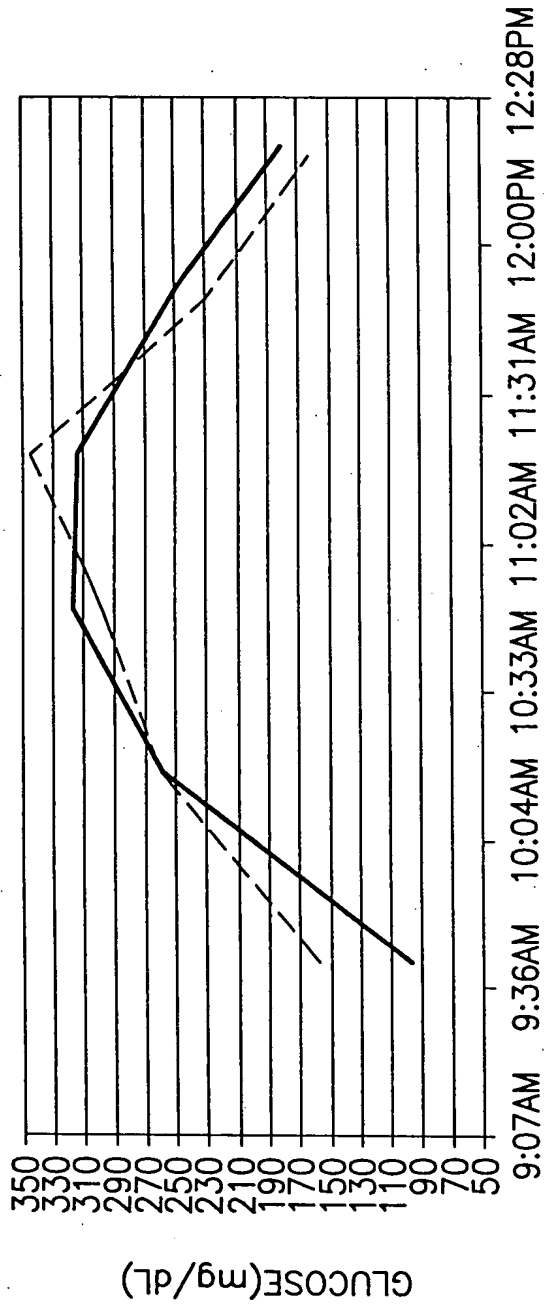

GLUCOSE(mg/dL)
350
330
310
290
270
250
230
210
190
170
150
130
110
90
70
50
9:07AM
9:36AM
10:04AM
10:33AM
11:02AM
11:31AM
12:00PM
12:28PM
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= −65.6%
MAX= 12.5%
AVE= 17.3%

Fig. 13C

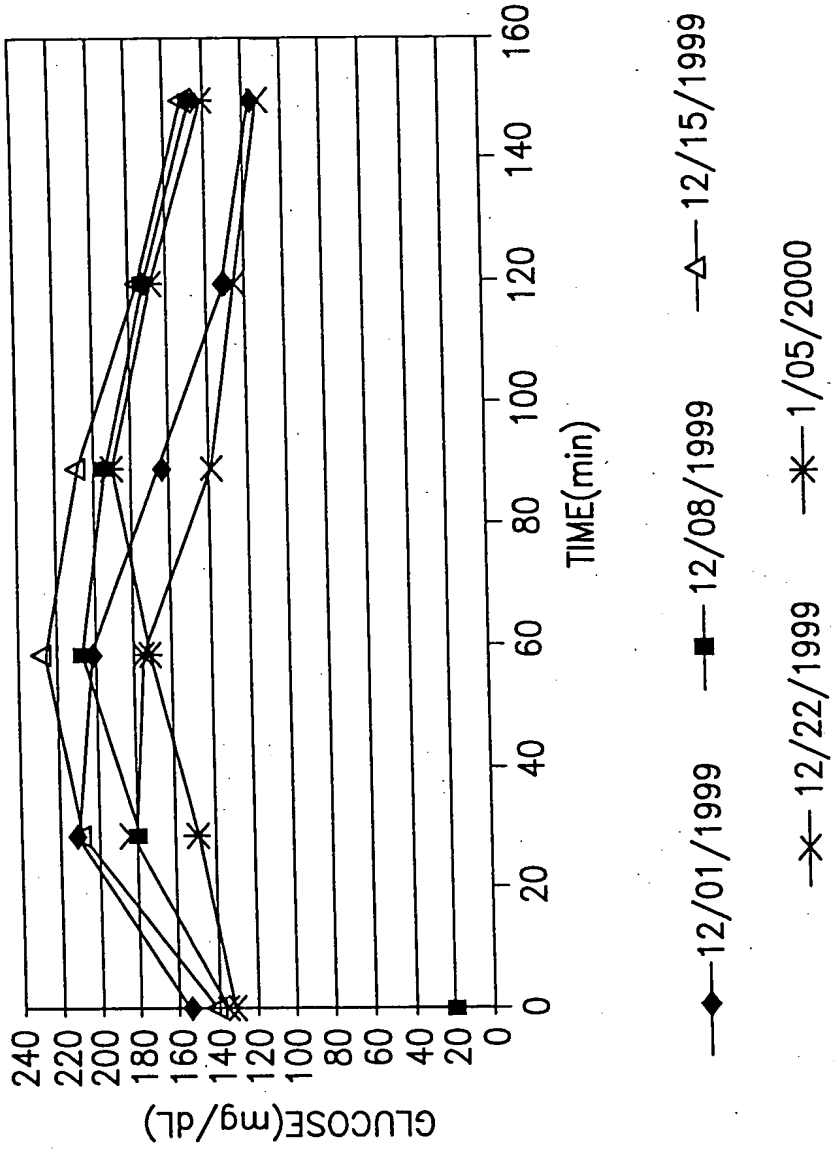

GLUCOSE(mg/dL)
240
220
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
TIME(min)
12/01/1999
12/08/1999
12/15/1999
12/22/1999
1/05/2000

Fig. 14A

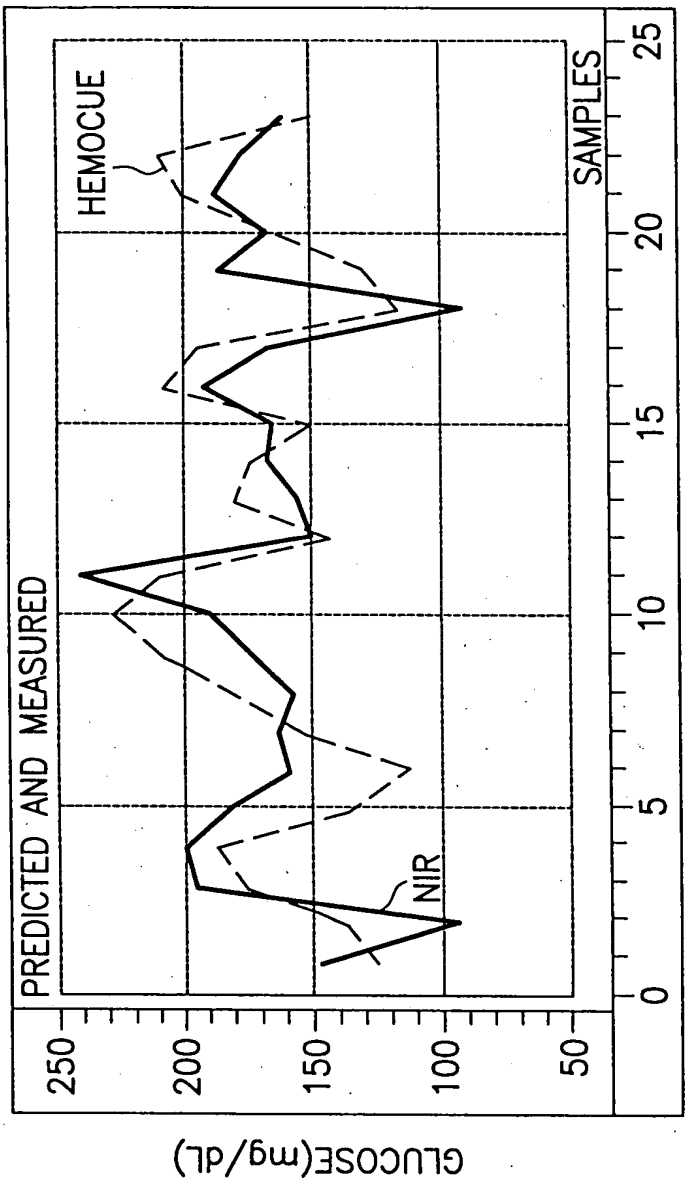

PREDICTED AND MEASURED
HEMOCUE
NIR
SAMPLES
GLUCOSE(mg/dL)
250
200
150
100
50
0
5
10
15
20
25
SAMPLE NUMBER

Fig. 14B

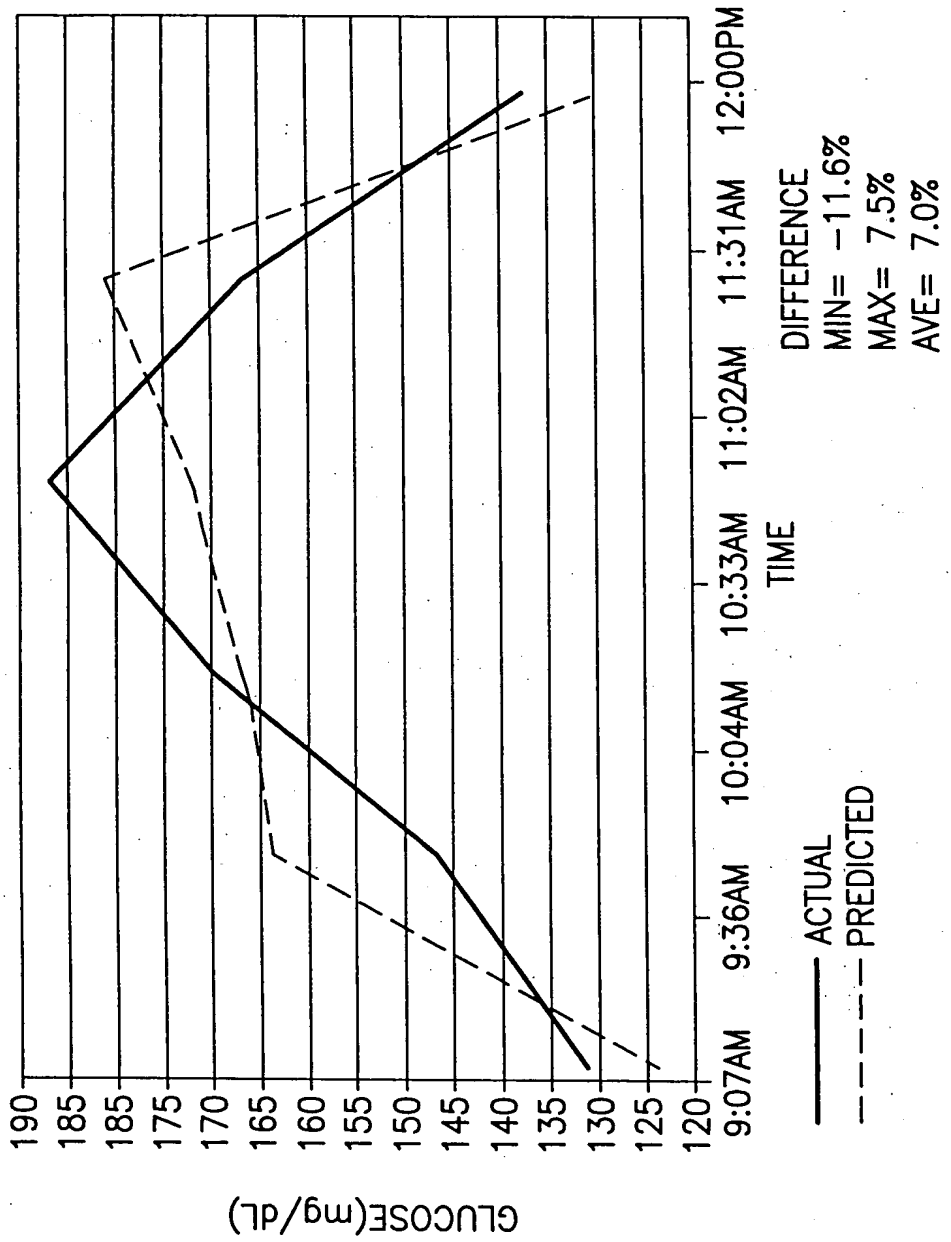

GLUCOSE(mg/dL)
190
185
185
175
170
165
160
155
150
145
140
135
130
125
120
9:07AM
9:36AM
10:04AM
10:33AM
11:02AM
11:31AM
12:00PM
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= -11.6%
MAX= 7.5%
AVE= 7.0%

Fig. 14C

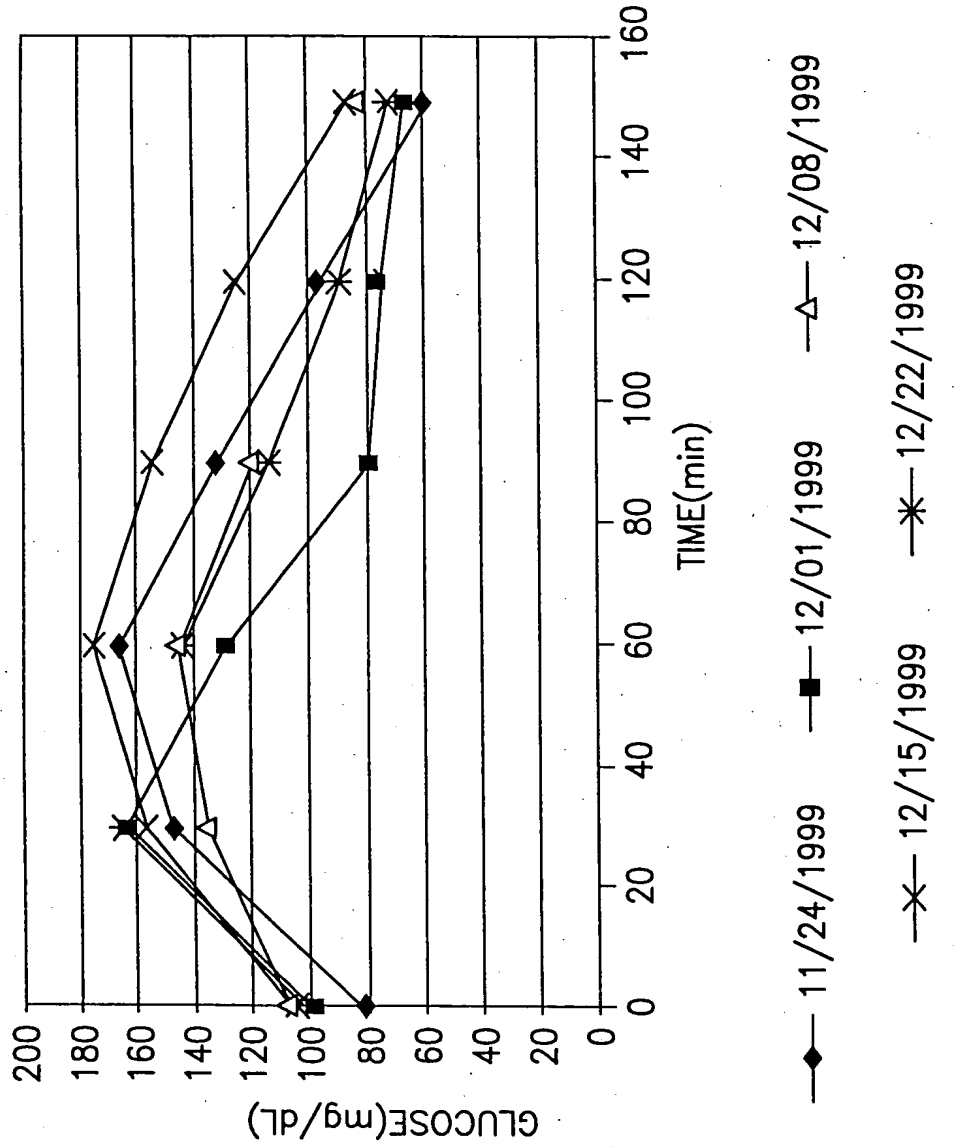

GLUCOSE(mg/dL)
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
TIME(min)
11/24/1999
12/01/1999
12/08/1999
12/15/1999
12/22/1999

Fig. 15A

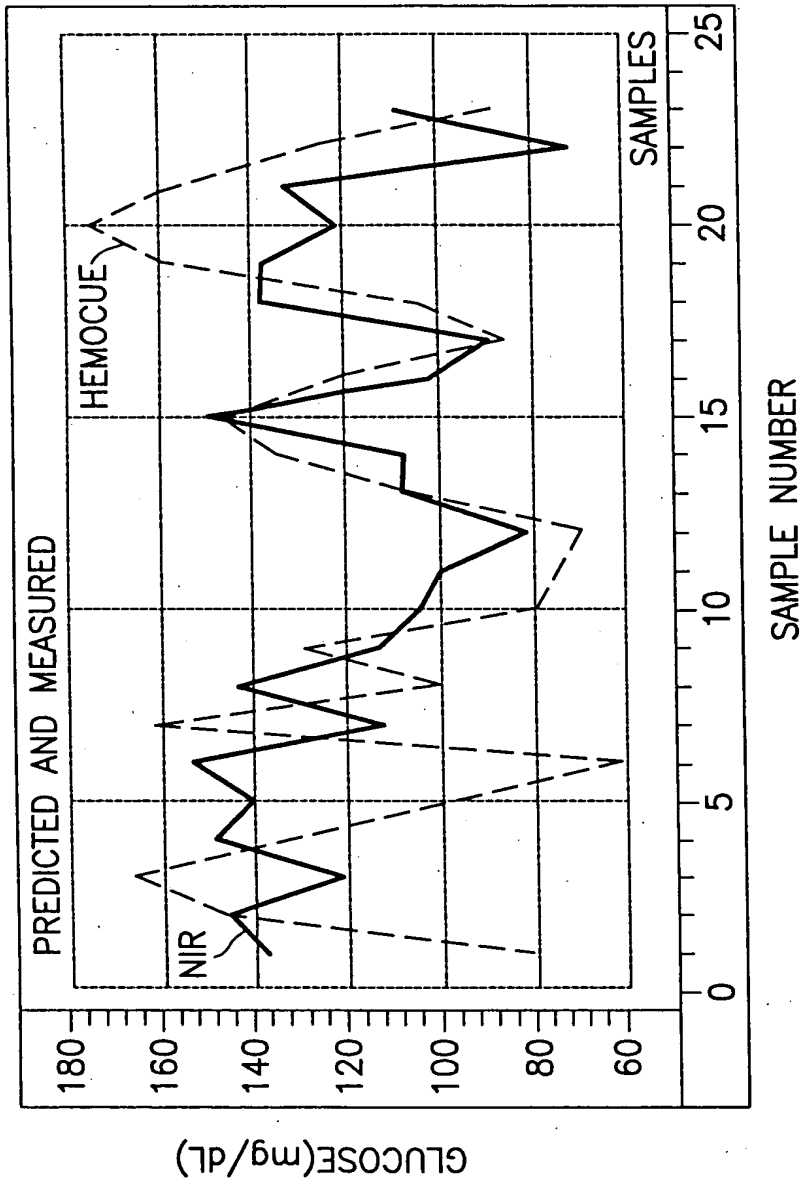

PREDICTED AND MEASURED
HEMOCUE
NIR
SAMPLES
GLUCOSE(mg/dL)
SAMPLE NUMBER
180
160
140
120
100
80
60
0
5
10
15
20
25

Fig. 15B

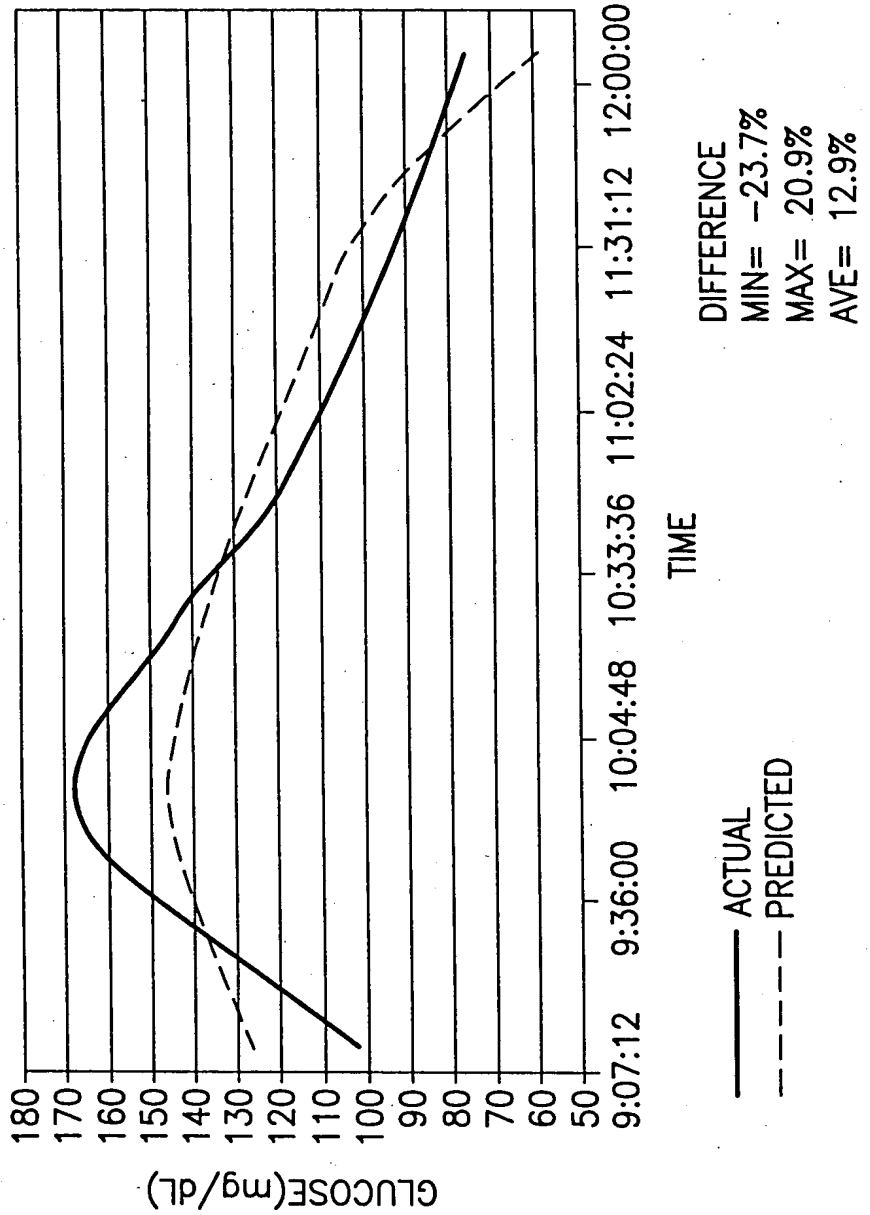

GLUCOSE(mg/dL)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
9:07:12
9:36:00
10:04:48
10:33:36
11:02:24
11:31:12
12:00:00
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= -23.7%
MAX= 20.9%
AVE= 12.9%

Fig. 15C

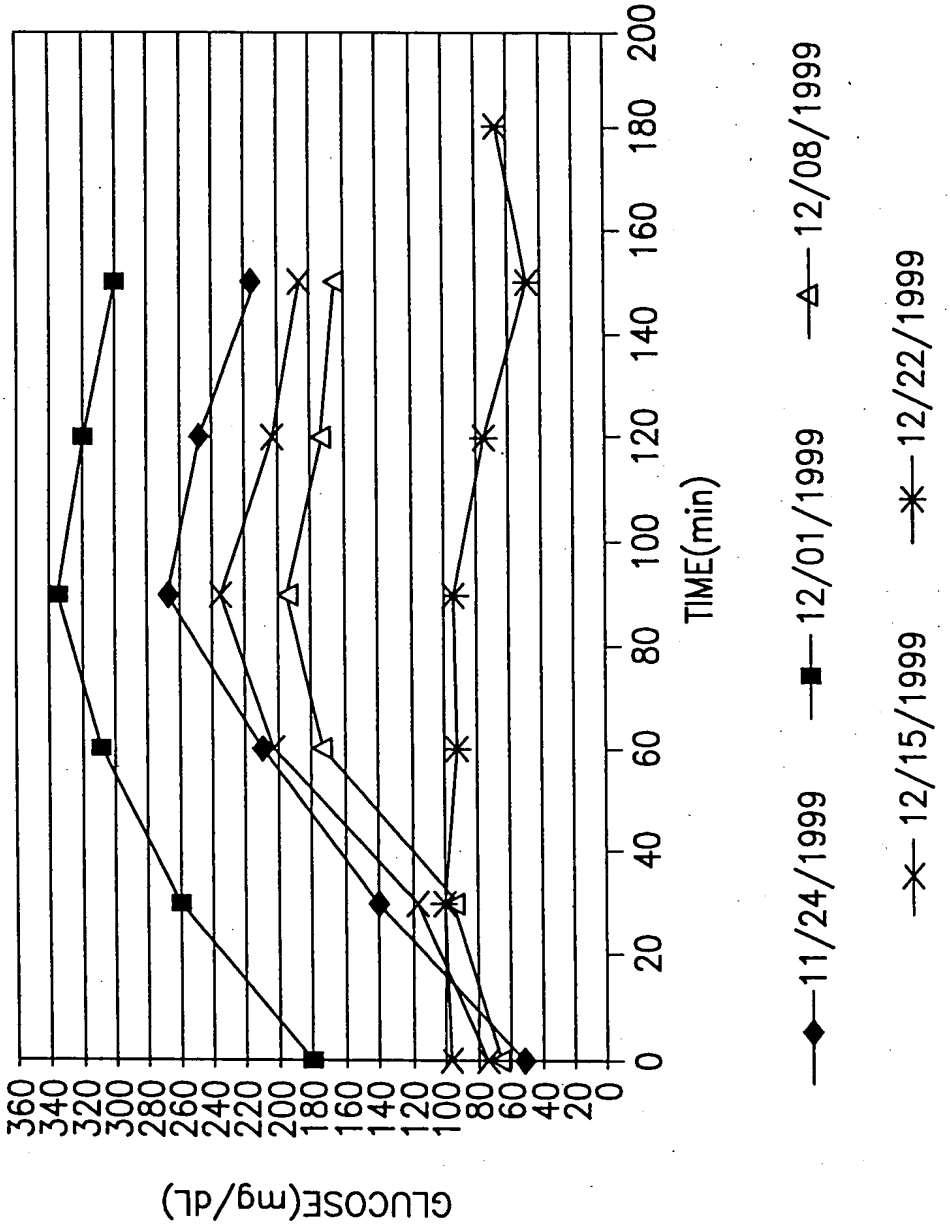

GLUCOSE(mg/dL)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
TIME(min)
11/24/1999
12/01/1999
12/08/1999
12/15/1999
12/22/1999

Fig. 16A

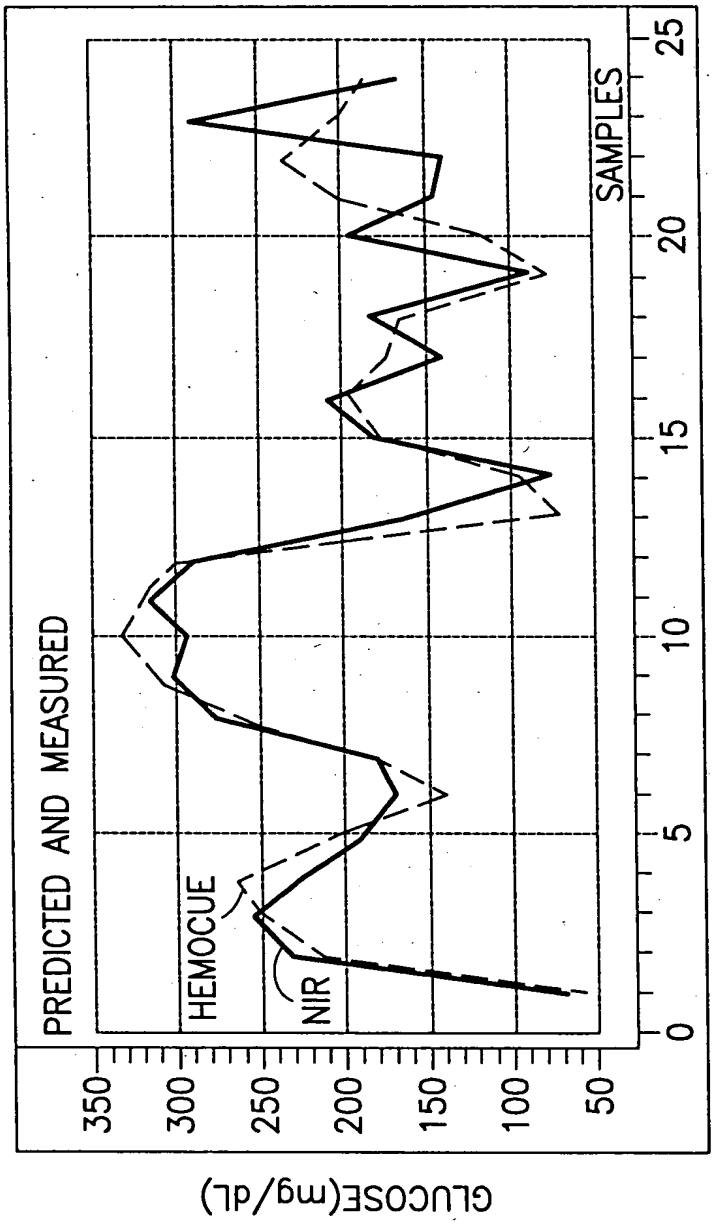

PREDICTED AND MEASURED
HEMOCUE
NIR
SAMPLES
GLUCOSE(mg/dL)
350
300
250
200
150
100
50
0
5
10
15
20
25
SAMPLE NUMBER

Fig. 16B

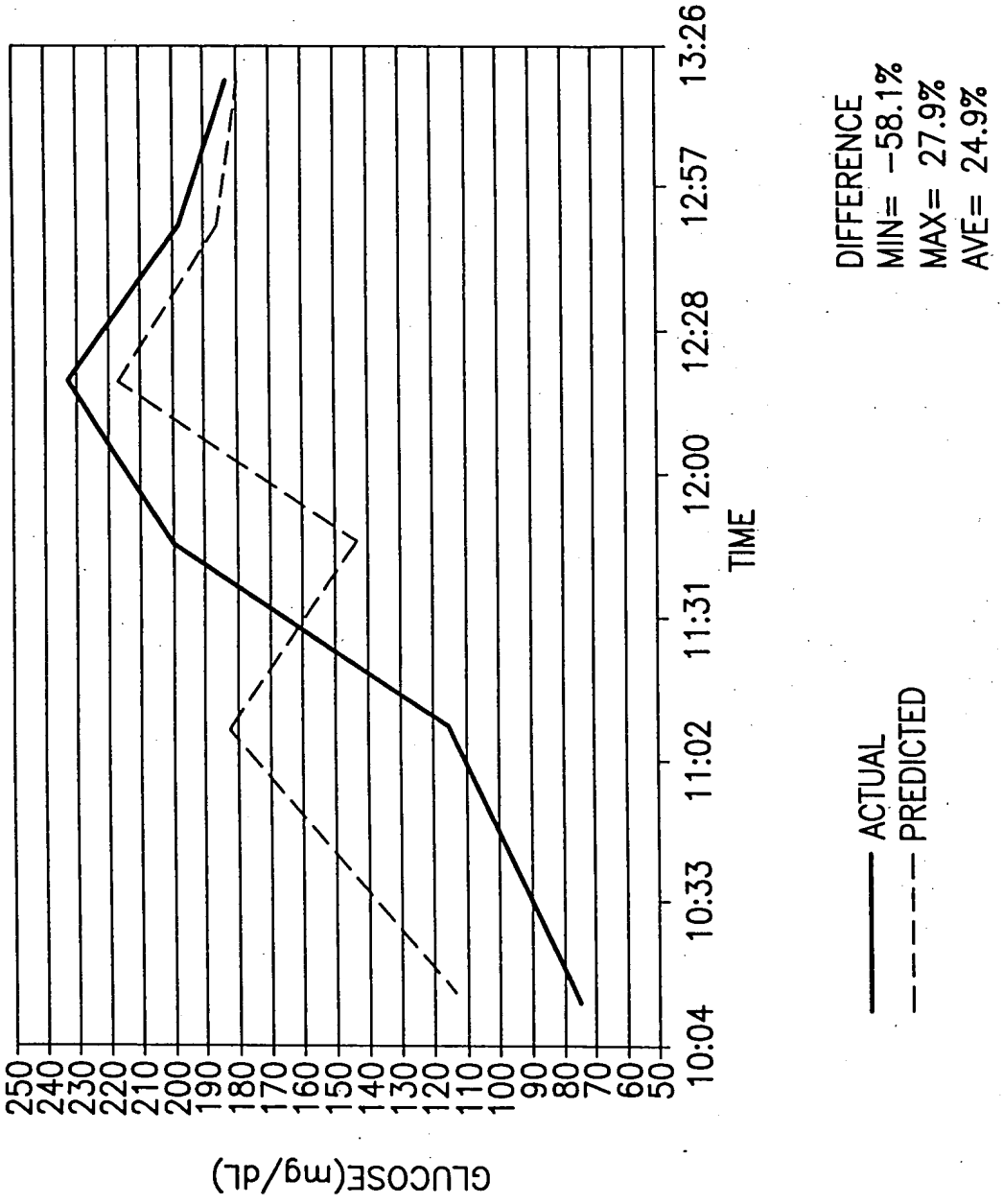

GLUCOSE(mg/dL)
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
10:04
10:33
11:02
11:31
12:00
12:28
12:57
13:26
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= -58.1%
MAX= 27.9%
AVE= 24.9%

Fig. 16C

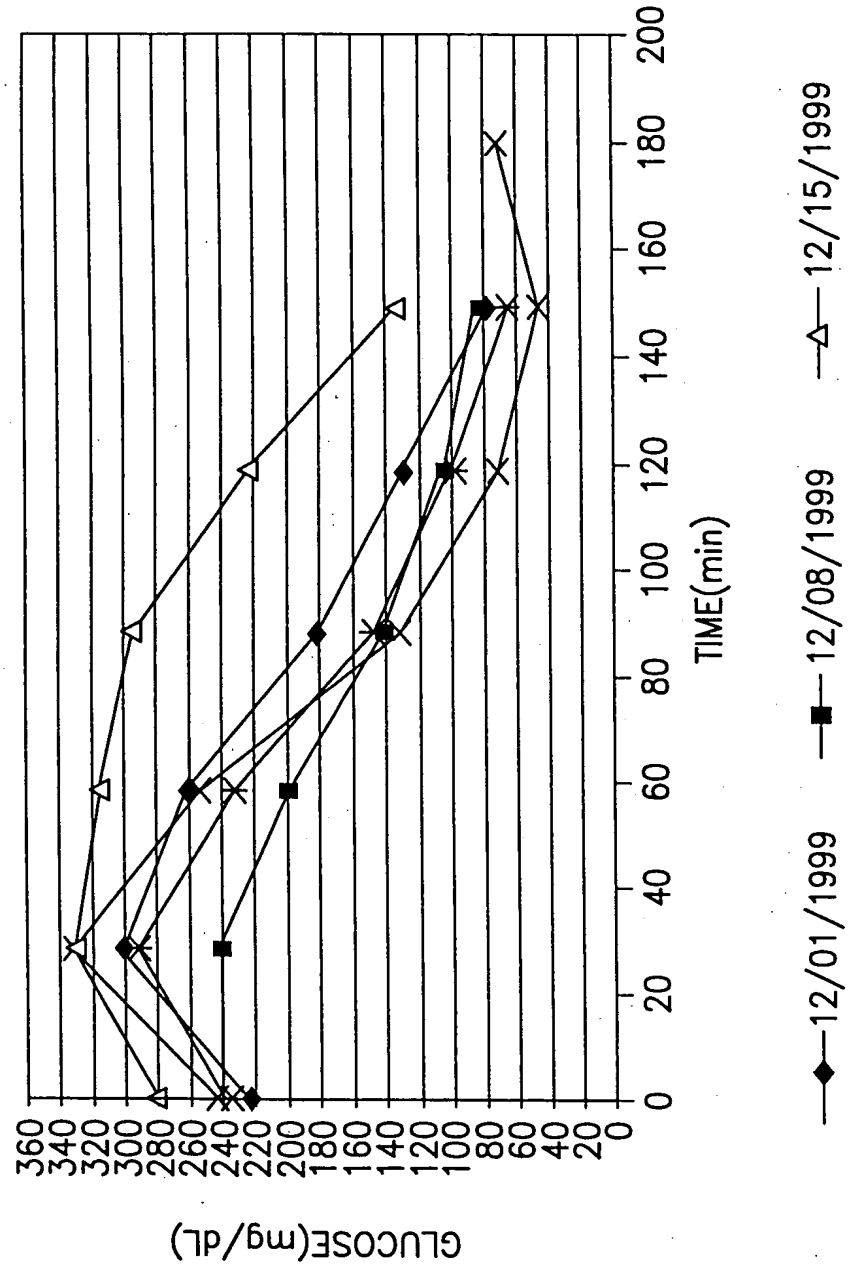

GLUCOSE(mg/dL)
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
TIME(min)
12/01/1999
12/08/1999
12/15/1999
12/22/1999
1/05/2000

Fig. 17A

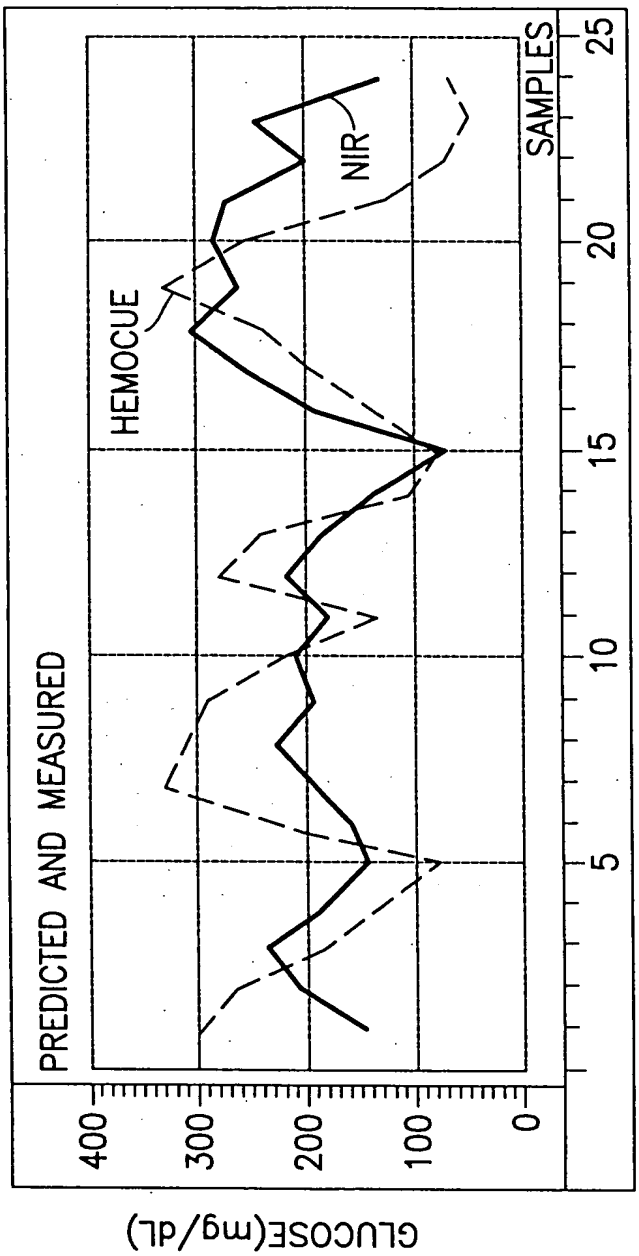

PREDICTED AND MEASURED
GLUCOSE(mg/dL)
400
300
200
100
0
HEMOCUE
NIR
SAMPLES
5
10
15
20
25
SAMPLE NUMBER

Fig. 17B

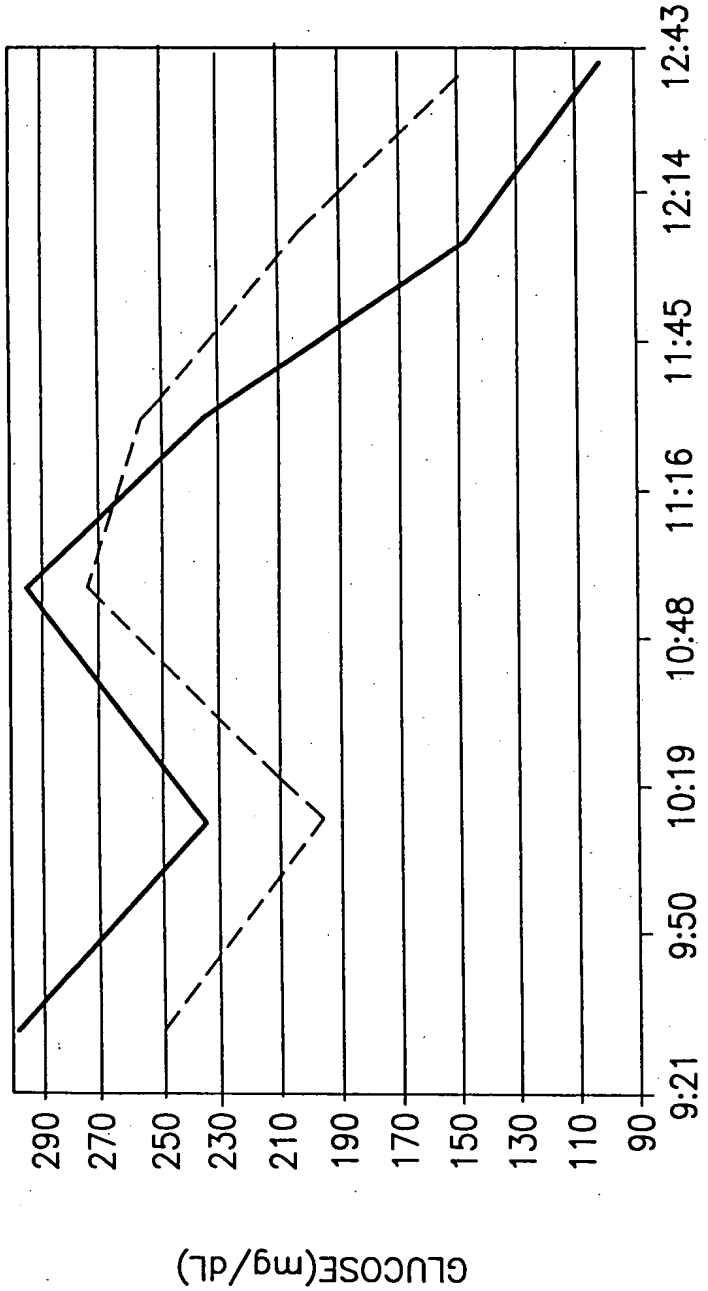

GLUCOSE(mg/dL)
290
270
250
230
210
190
170
150
130
110
90
9:21
9:50
10:19
10:48
11:16
11:45
12:14
12:43
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= −132.4%
MAX= 42.6%
AVE= 46.6%

Fig. 17C

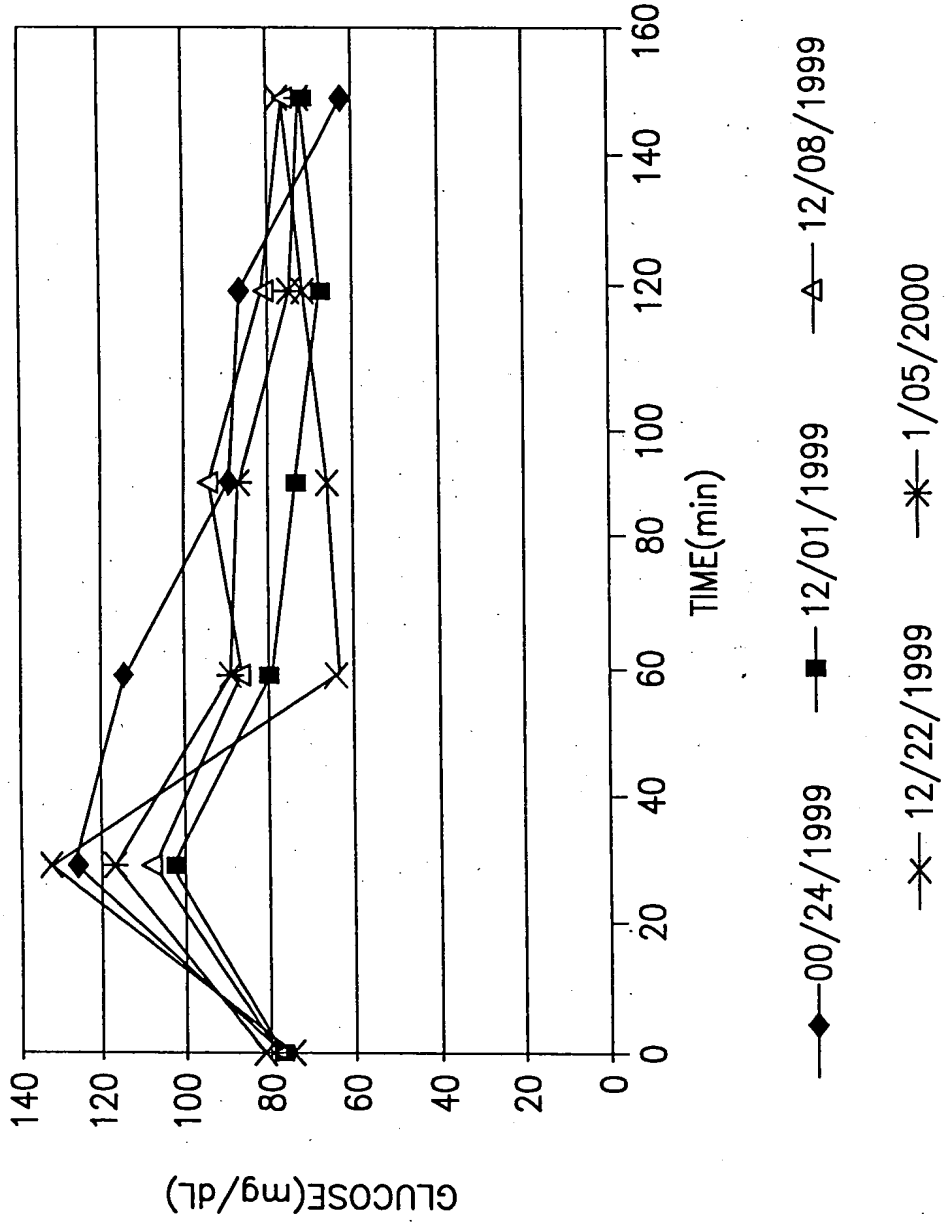

GLUCOSE(mg/dL)
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
TIME(min)
00/24/1999
12/01/1999
12/08/1999
12/22/1999
1/05/2000

Fig. 18A

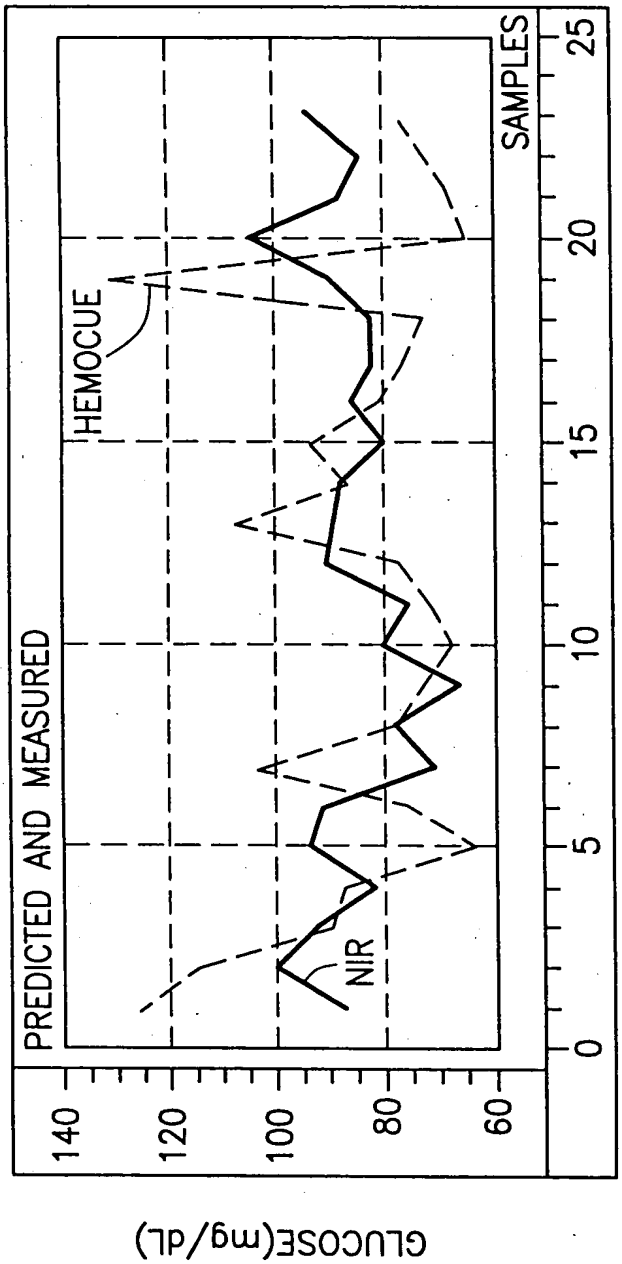

PREDICTED AND MEASURED
HEMOCUE
NIR
SAMPLES
140
120
100
80
60
0
5
10
15
20
25
GLUCOSE(mg/dL)
SAMPLE NUMBER

Fig. 18B

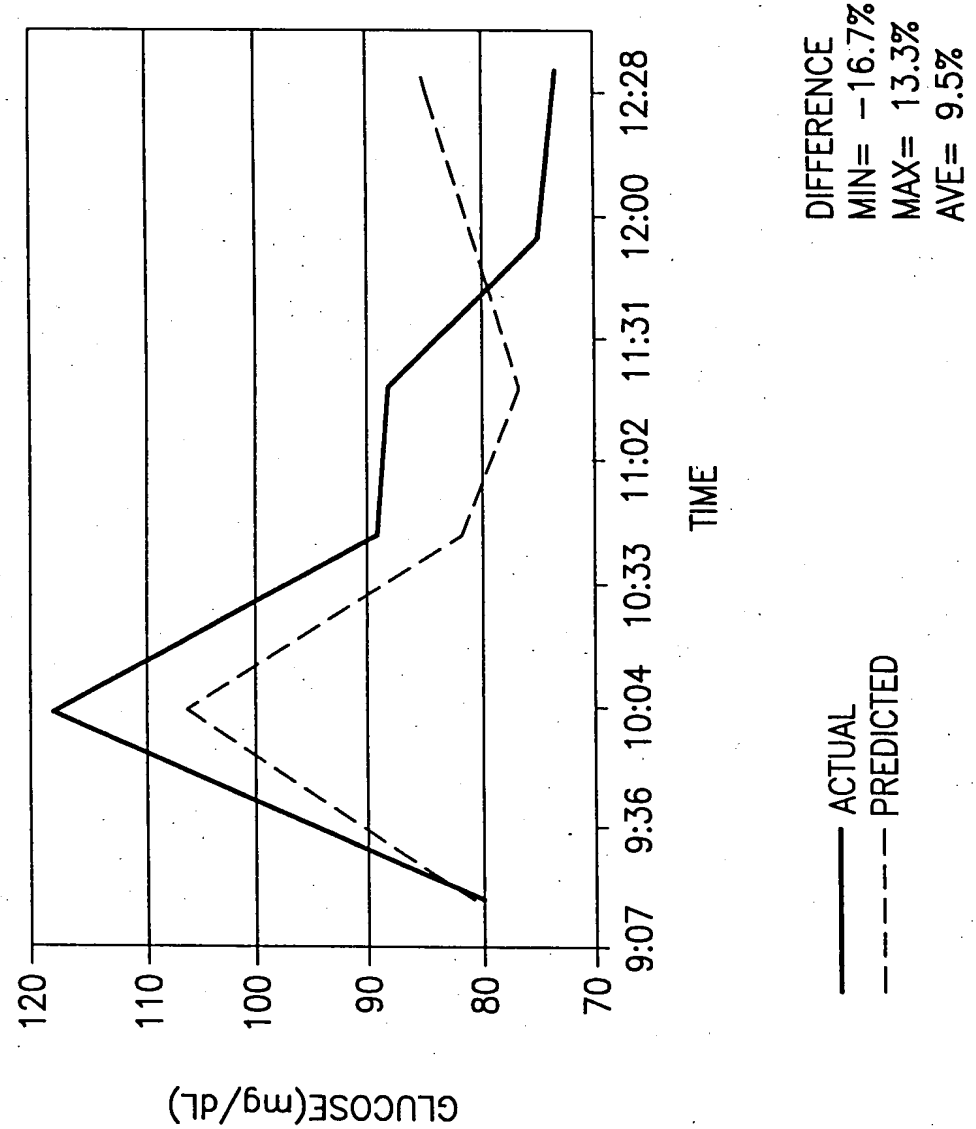

GLUCOSE(mg/dL)
120
110
100
90
80
70
9:07
9:36
10:04
10:33
11:02
11:31
12:00
12:28
TIME
ACTUAL
PREDICTED
DIFFERENCE
MIN= −16.7%
MAX= 13.3%
AVE= 9.5%

Fig. 18C

DIFFUSE REFLECTANCE TRANSFORMS

SECOND TRANSFORM:

1ST TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	1	1	1	1	1	1	1	0	1	1	1
BASECORR	0	0	1	1	1	0	0	1	1	0	1	1	1
NORMALIZ	0	1	0	1	1	0	0	1	0	0	1	1	1
FIRSTDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
SECNDDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
MULTSCAT	0	0	0	1	1	0	1	1	0	0	1	1	1
KUNLMUNK	0	1	1	1	1	1	0	1	0	0	1	1	0
SMOOTHNG	0	1	1	1	1	1	1	0	0	0	1	1	1
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	0	0	1	0	0	0	0	1	0	0	0	0	0
SGDERIV2	0	0	1	0	0	0	0	1	0	0	0	0	0
ABS2REFL	0	1	1	1	1	1	0	1	0	0	1	1	0

Fig. 19A

DIFFUSE REFLECTANCE RATIOS

DENOMINATOR TRANSFORM:

NUMERATOR TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	0	0	0	0	0	0	0	0	0	0	0
BASECORR	0	1	0	0	0	0	0	0	0	0	0	0	0
NORMALIZ	0	1	1	0	0	0	0	0	0	0	0	0	0
FIRSTDRV	1	0	0	1	0	0	0	0	0	0	0	0	0
SECNDDRV	1	0	0	0	1	0	0	0	0	0	0	0	0
MULTSCAT	0	1	0	0	0	1	0	0	0	0	0	0	0
KUNLMUNK	0	1	0	0	0	0	1	0	0	0	0	0	0
SMOOTHNG	0	1	0	0	0	0	0	1	0	0	0	0	0
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	1	0	0	0	0	0	0	0	0	0	1	0	0
SGDERIV2	1	0	0	0	0	0	0	0	0	0	0	1	0
ABS2REFL	0	1	0	0	0	0	0	0	0	0	0	0	1

Fig.19B

DIFFUSE TRANSMITTANCE TRANSFORMS

SECOND TRANSFORM:

1ST TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	1	1	1	1	0	1	1	0	1	1	1
BASECORR	0	0	1	1	1	0	0	1	1	0	1	1	1
NORMALIZ	0	1	0	1	1	0	0	1	0	0	1	1	1
FIRSTDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
SECNDDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
MULTSCAT	0	0	0	1	1	0	0	1	0	0	1	1	1
KUNLMUNK	0	0	0	0	0	0	0	0	0	0	0	0	0
SMOOTHNG	0	1	1	1	1	1	0	0	0	0	1	1	1
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	0	0	1	0	0	0	0	1	0	0	0	0	0
SGDERIV2	0	0	1	0	0	0	0	1	0	0	0	0	0
ABS2REFL	0	1	1	1	1	1	0	1	0	0	1	1	0

Fig. 20A

DIFFUSE TRANSMITTANCE RATIOS

DENOMINATOR TRANSFORM:

NUMERATOR TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	0	0	0	0	0	0	0	0	0	0	0
BASECORR	0	1	0	0	0	0	0	0	0	0	0	0	0
NORMALIZ	0	1	1	0	0	0	0	0	0	0	0	0	0
FIRSTDRV	1	0	0	1	0	0	0	0	0	0	0	0	0
SECNDDRV	1	0	0	0	1	0	0	0	0	0	0	0	0
MULTSCAT	0	1	0	0	0	1	0	0	0	0	0	0	0
KUNLMUNK	0	0	0	0	0	0	0	0	0	0	0	0	0
SMOOTHNG	0	1	0	0	0	0	0	1	0	0	0	0	0
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	1	0	0	0	0	0	0	0	0	0	1	0	0
SGDERIV2	1	0	0	0	0	0	0	0	0	0	0	1	0
ABS2REFL	0	1	0	0	0	0	0	0	0	0	0	0	1

Fig. 20B

CLEAR TRANSMITTANCE TRANSFORMS

SECOND TRANSFORM:

1ST TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	1	1	1	0	0	1	1	0	1	1	1
BASECORR	0	0	1	1	1	0	0	1	1	0	1	1	1
NORMALIZ	0	1	0	1	1	0	0	1	0	0	1	1	1
FIRSTDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
SECNDDRV	0	0	1	0	0	0	0	1	0	0	0	0	0
MULTSCAT	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNLMUNK	0	0	0	0	0	0	0	0	0	0	0	0	0
SMOOTHNG	0	1	1	1	1	0	0	0	0	0	1	1	1
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	0	0	1	0	0	0	0	1	0	0	0	0	0
SGDERIV2	0	0	1	0	0	0	0	1	0	0	0	0	0
ABS2REFL	0	1	1	1	1	0	0	1	0	0	1	1	0

Fig. 21A

CLEAR TRANSMITTANCE RATIOS

DENOMINATOR TRANSFORM:

NUMERATOR TRANSFORM	NULLS	BASECORR	NORMALIZ	FIRSTDRV	SECNDDRV	MULTSCAT	KUBLMUNK	SMOOTHNG	RATIO	MEANCNTR	SGDERIV1	SGDERIV2	ABS2REFL
NULLS	1	1	0	0	0	0	0	0	0	0	0	0	0
BASECORR	0	1	0	0	0	0	0	0	0	0	0	0	0
NORMALIZ	0	1	1	0	0	0	0	0	0	0	0	0	0
FIRSTDRV	1	0	0	1	0	0	0	0	0	0	0	0	0
SECNDDRV	1	0	0	0	1	0	0	0	0	0	0	0	0
MULTSCAT	0	0	0	0	0	0	0	0	0	0	0	0	0
KUNLMUNK	0	0	0	0	0	0	0	0	0	0	0	0	0
SMOOTHNG	0	1	0	0	0	0	0	1	0	0	0	0	0
RATIO	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANCNTR	0	0	0	0	0	0	0	0	0	0	0	0	0
SGDERIV1	1	0	0	0	0	0	0	0	0	0	1	0	0
SGDERIV2	1	0	0	0	0	0	0	0	0	0	0	1	0
ABS2REFL	0	1	0	0	0	0	0	0	0	0	0	0	1

Fig. 21B

DERIVATIVE SPACING:

SPACING = INT (n ^ 1.4), n = 1 : 10

= 1, 2, 4, 6, 9, 12, 15, 18, 21, 25

Fig. 22

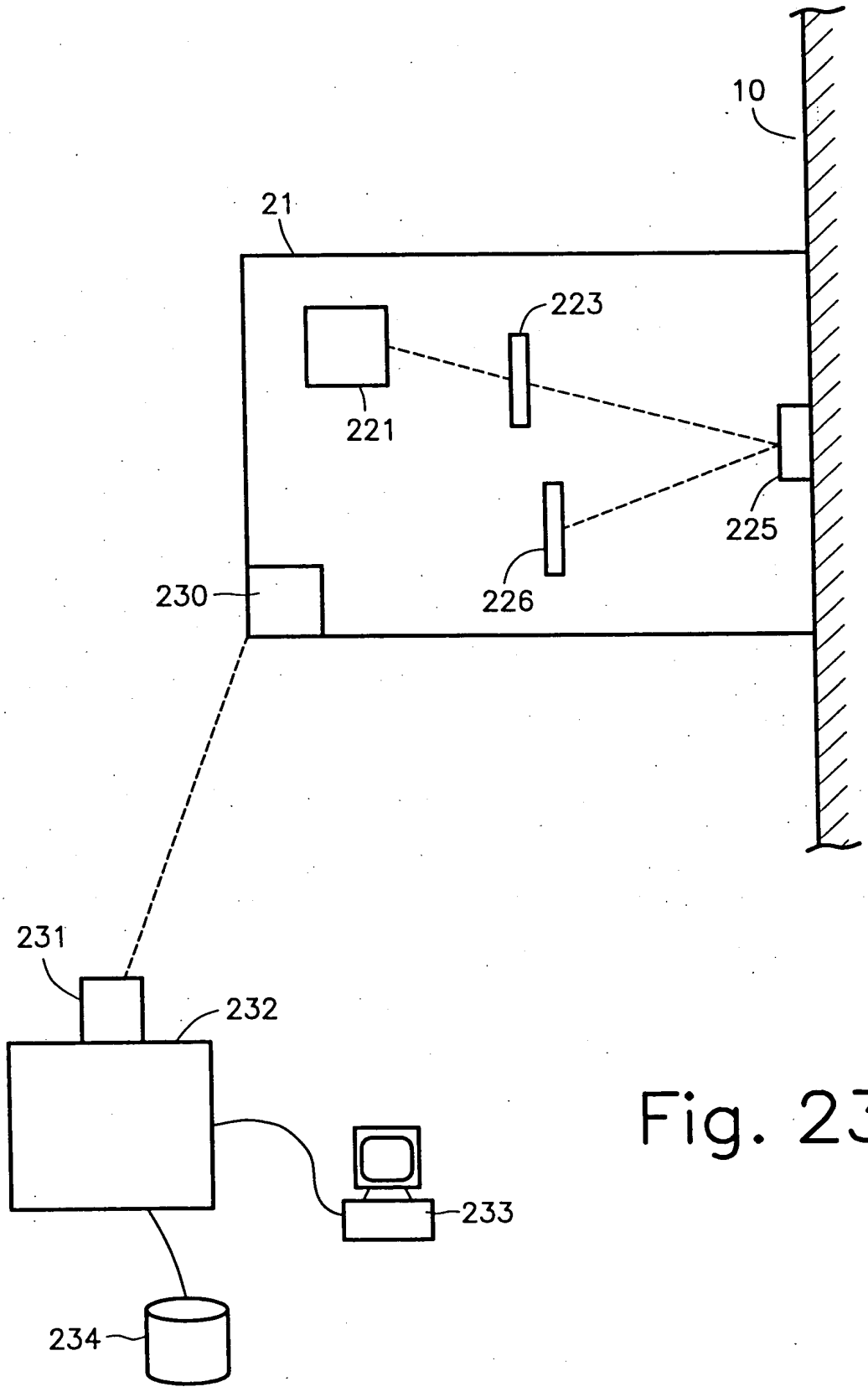


Fig. 23A

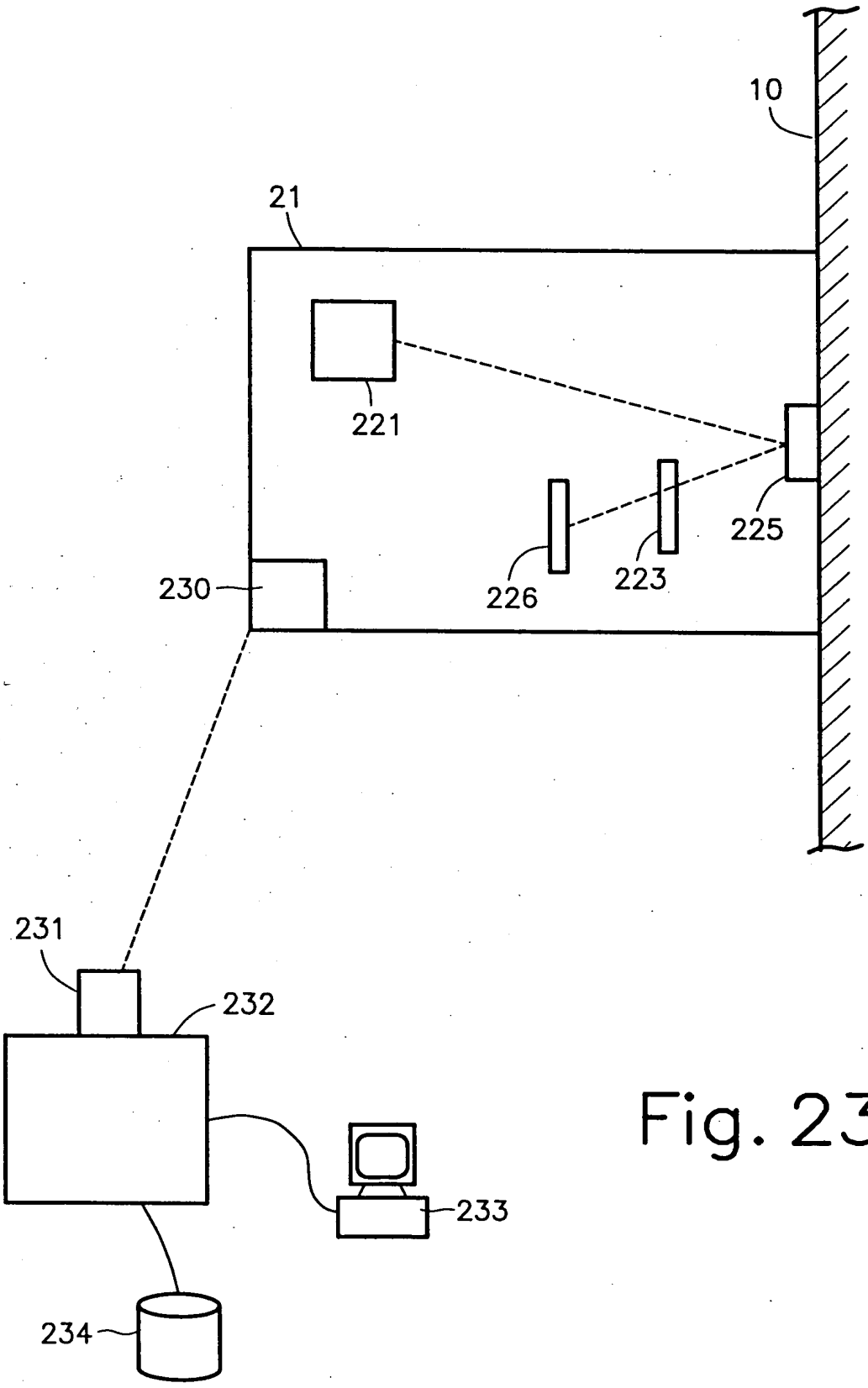


Fig. 23B

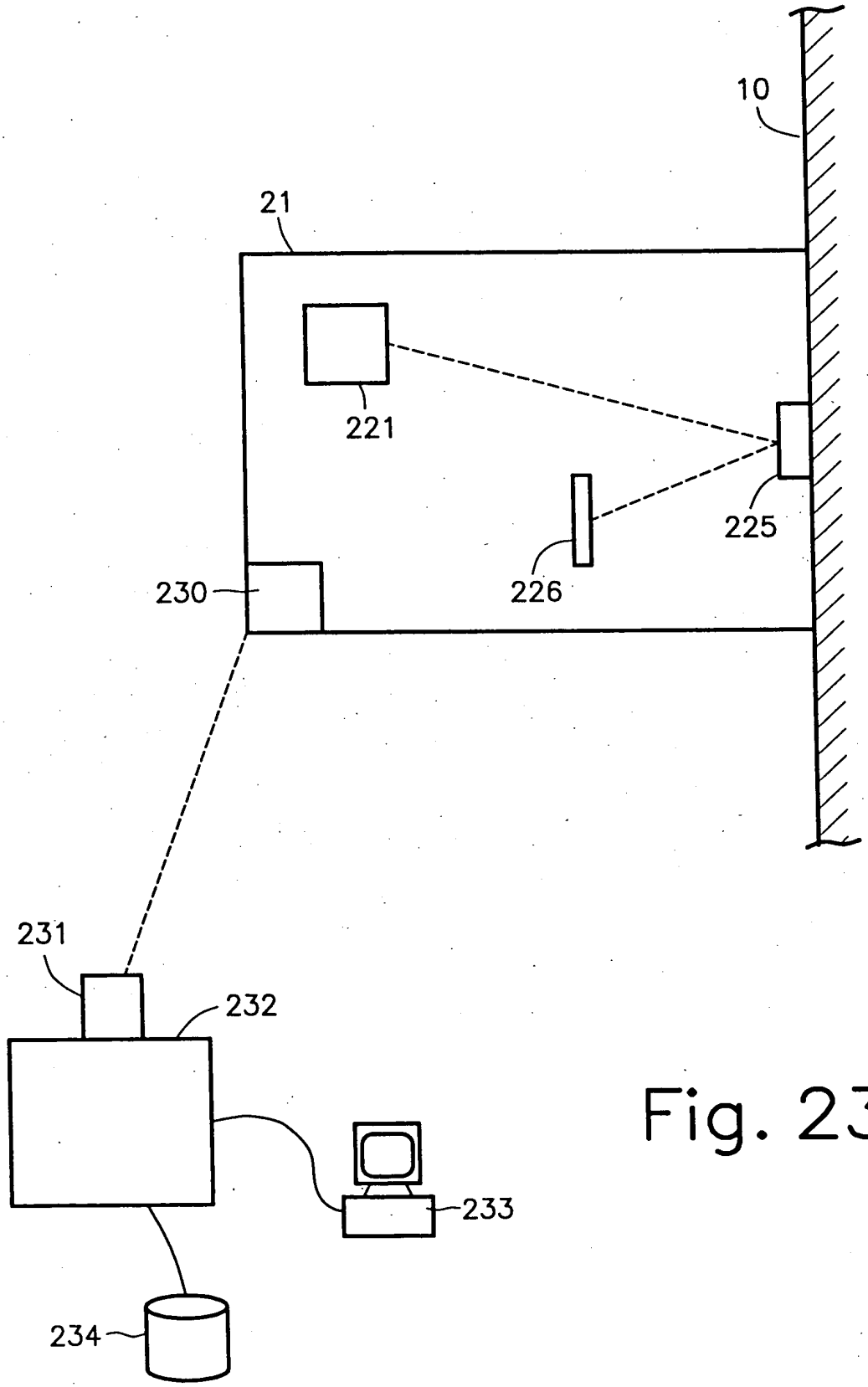


Fig. 23C

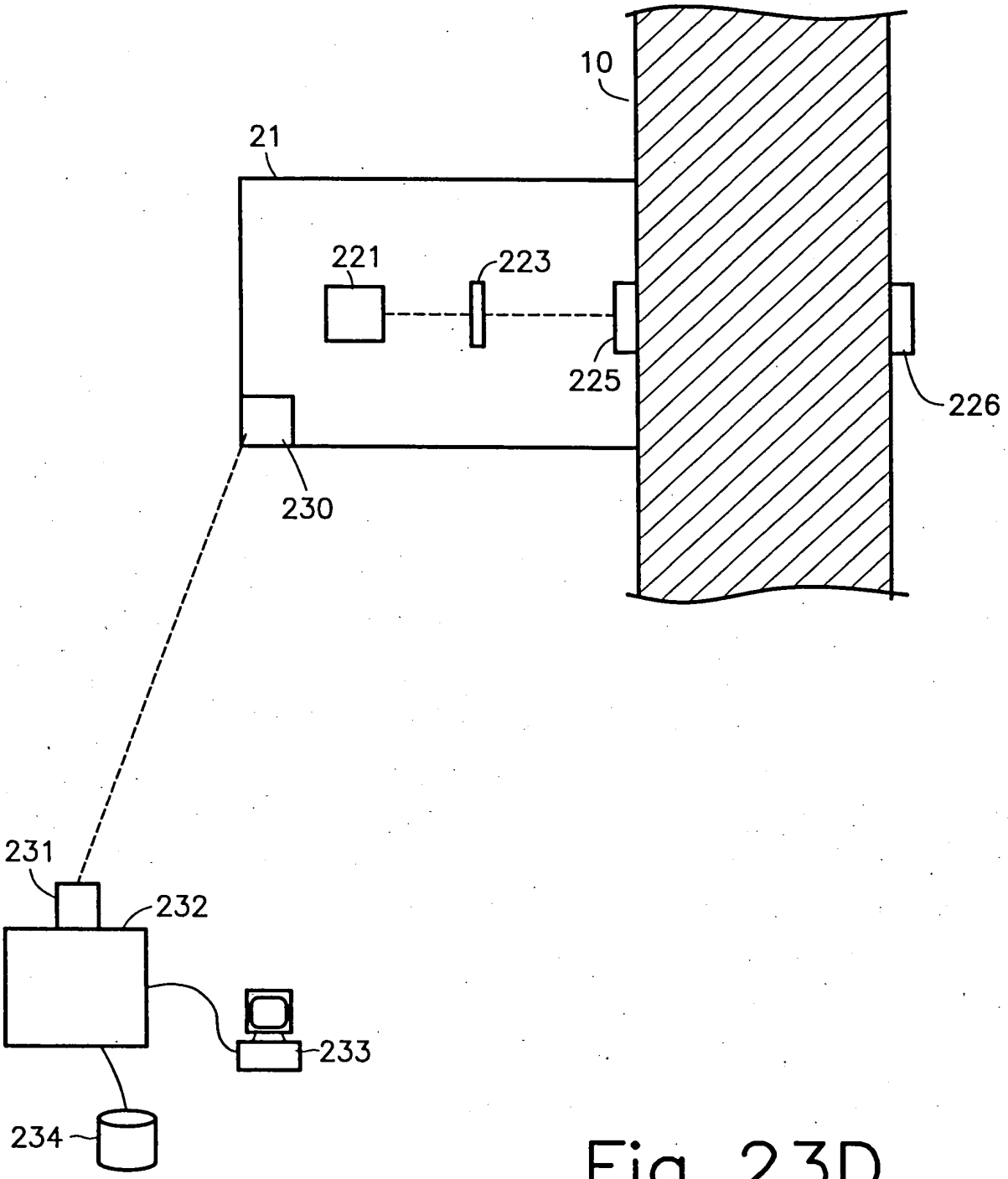


Fig. 23D

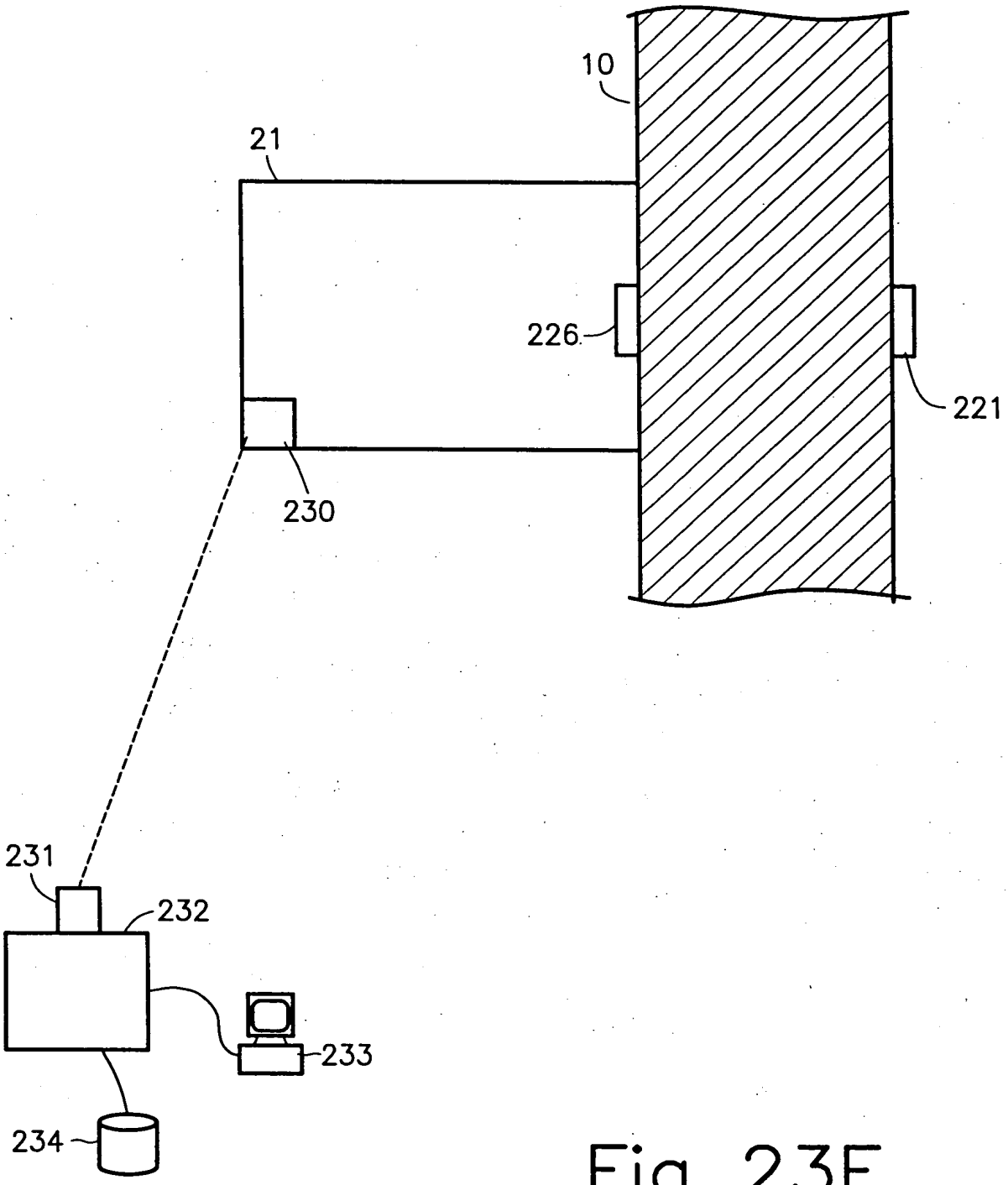


Fig. 23E

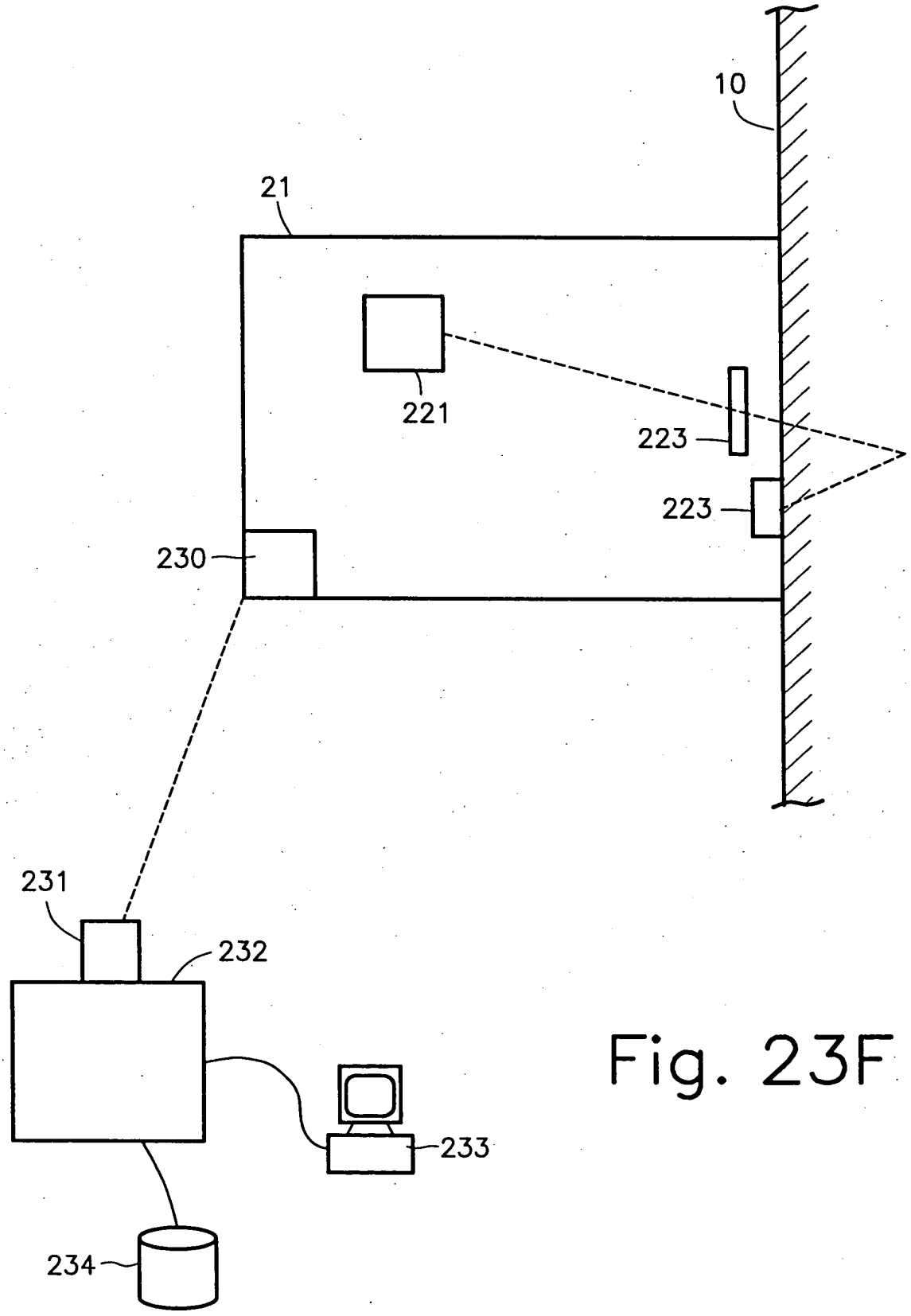


Fig. 23F

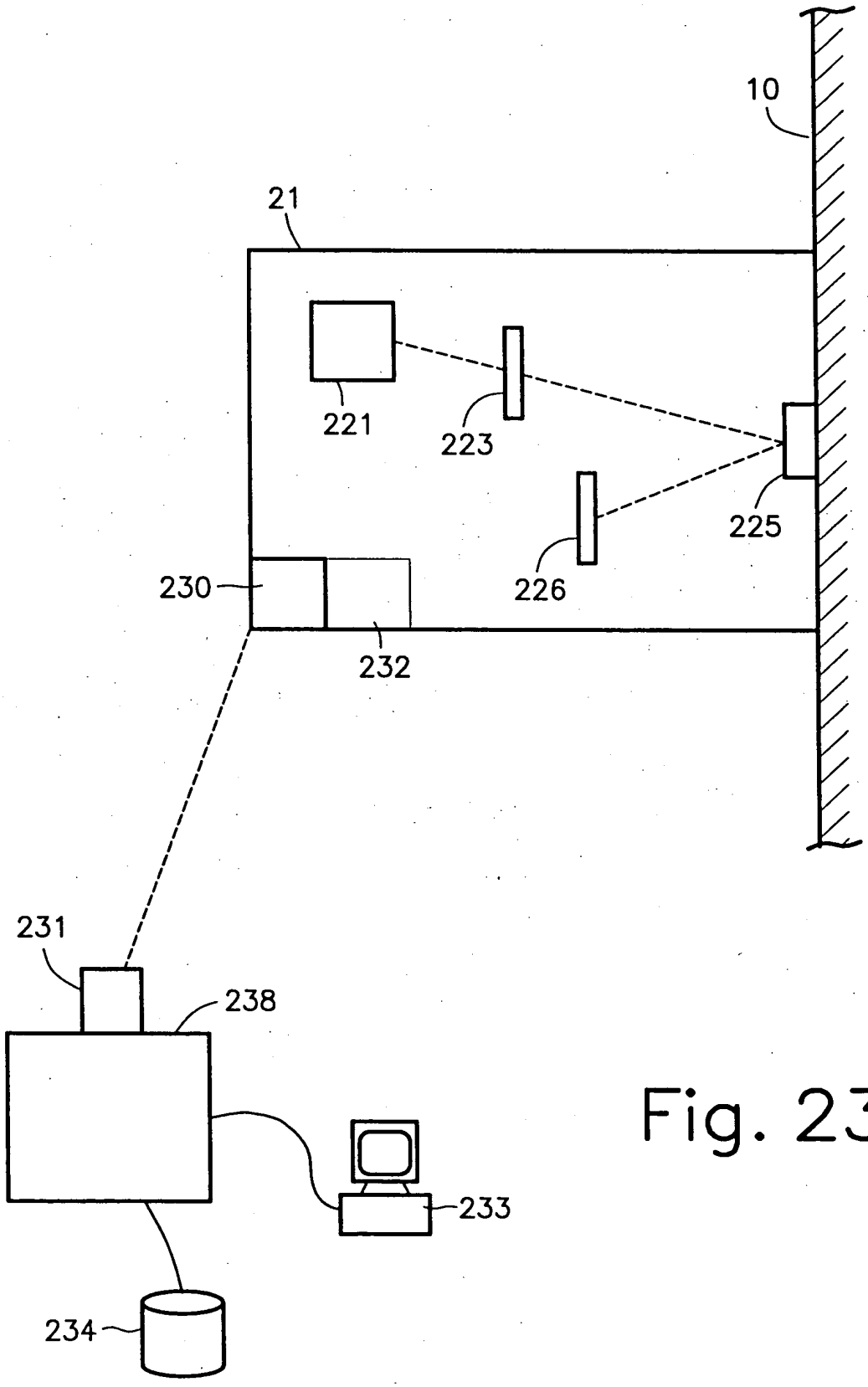


Fig. 23G

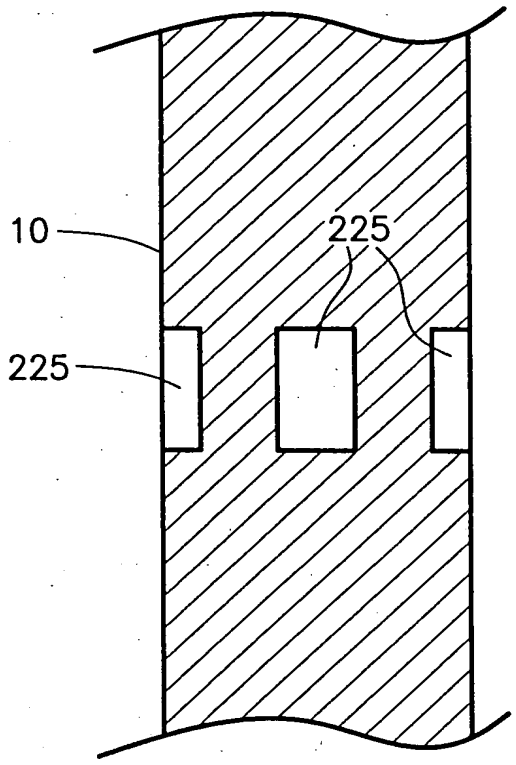


Fig. 24

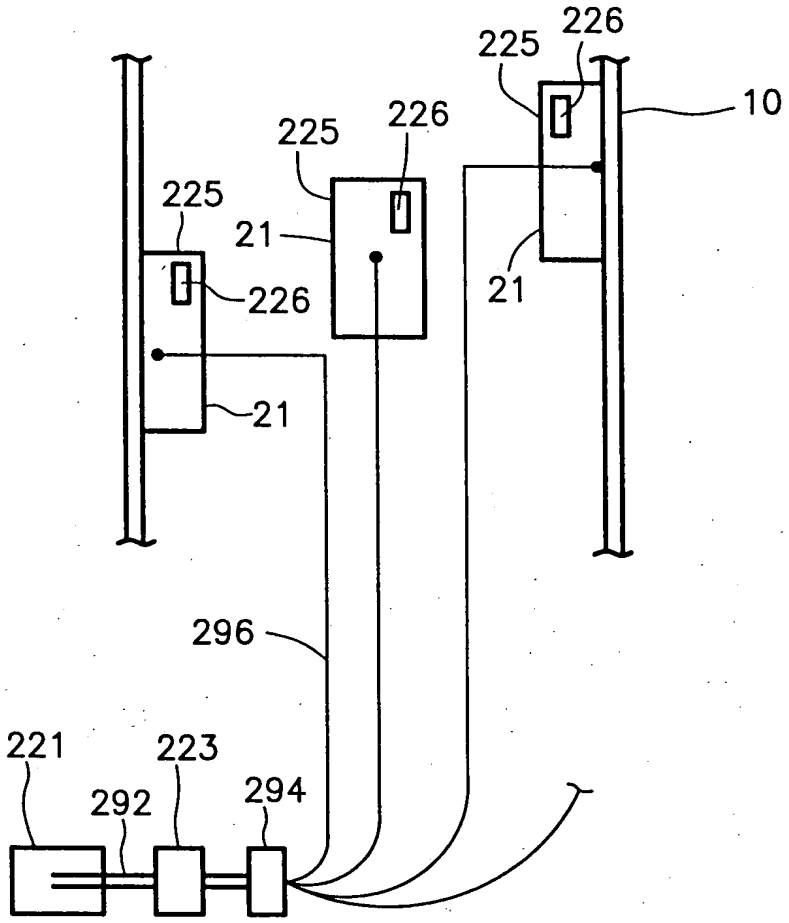


Fig. 25

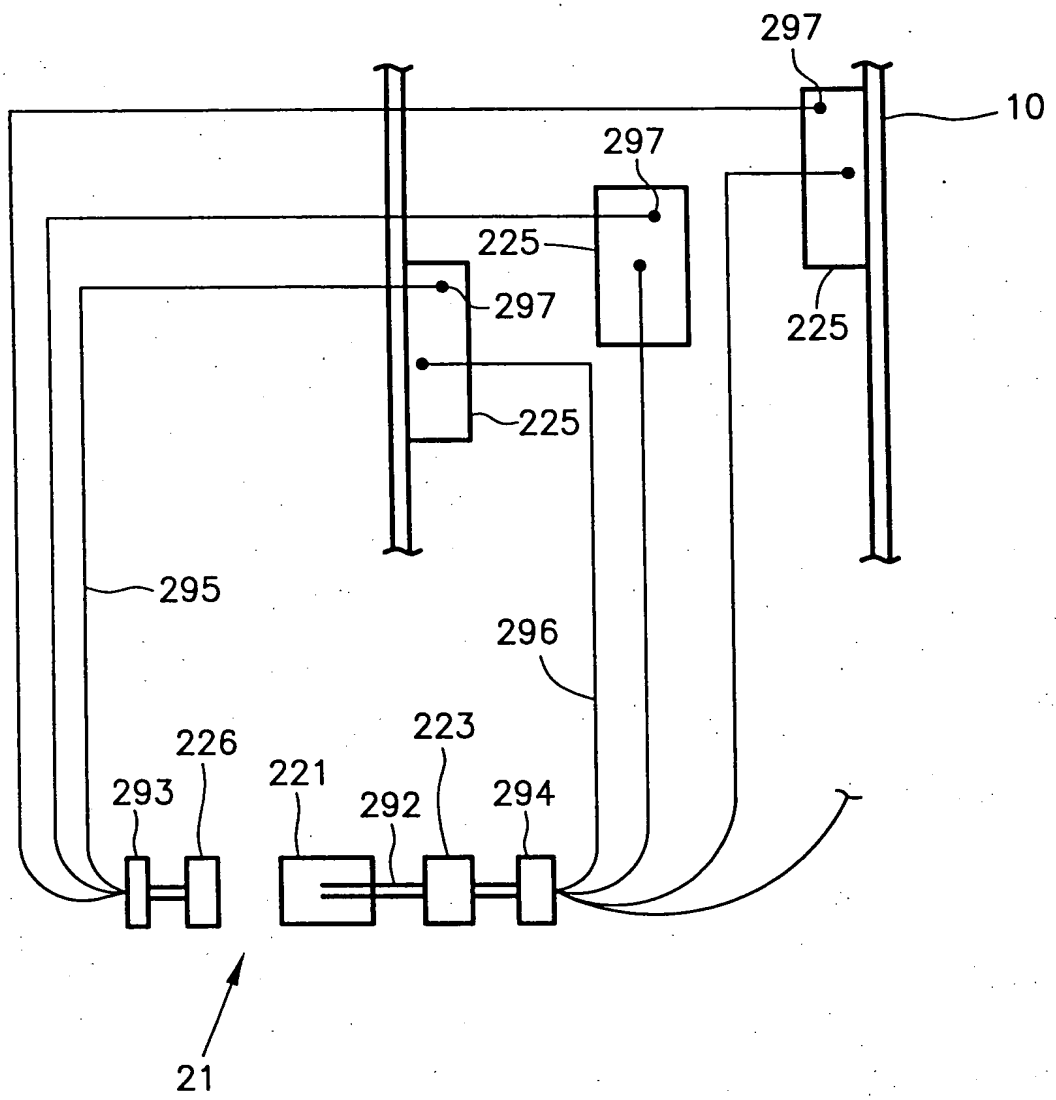


Fig. 26

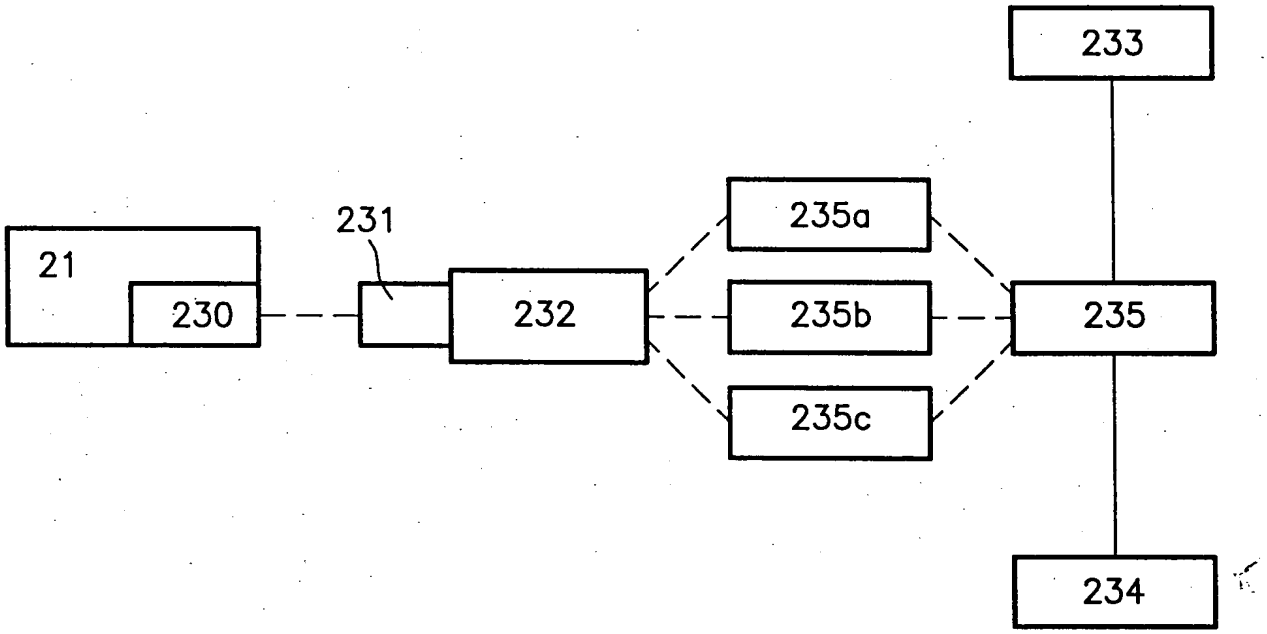


Fig. 27

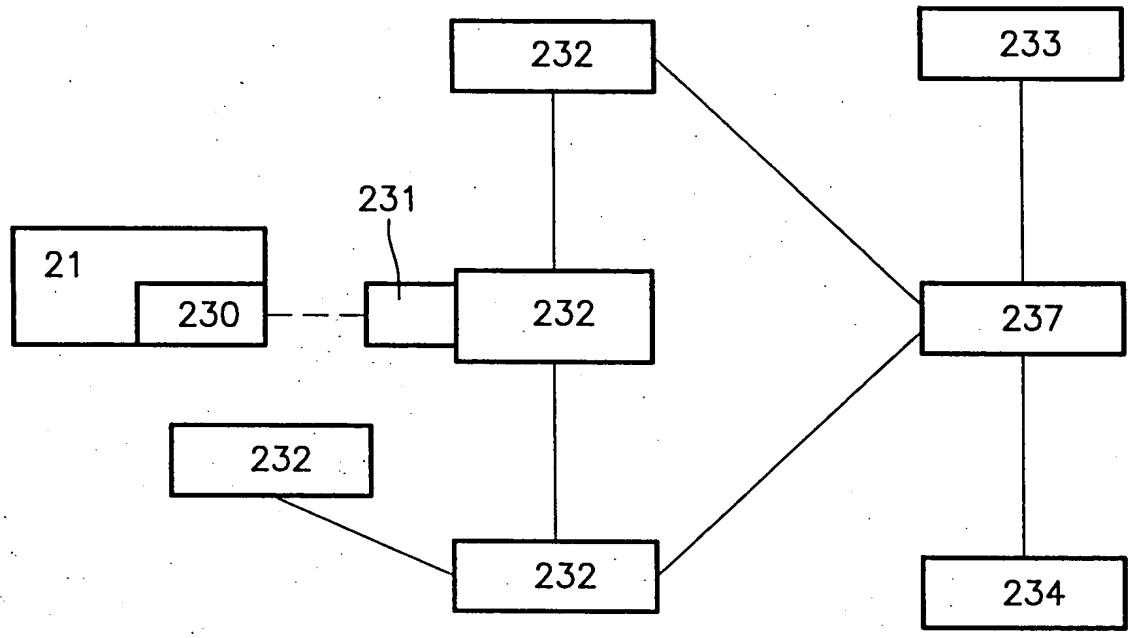


Fig. 28

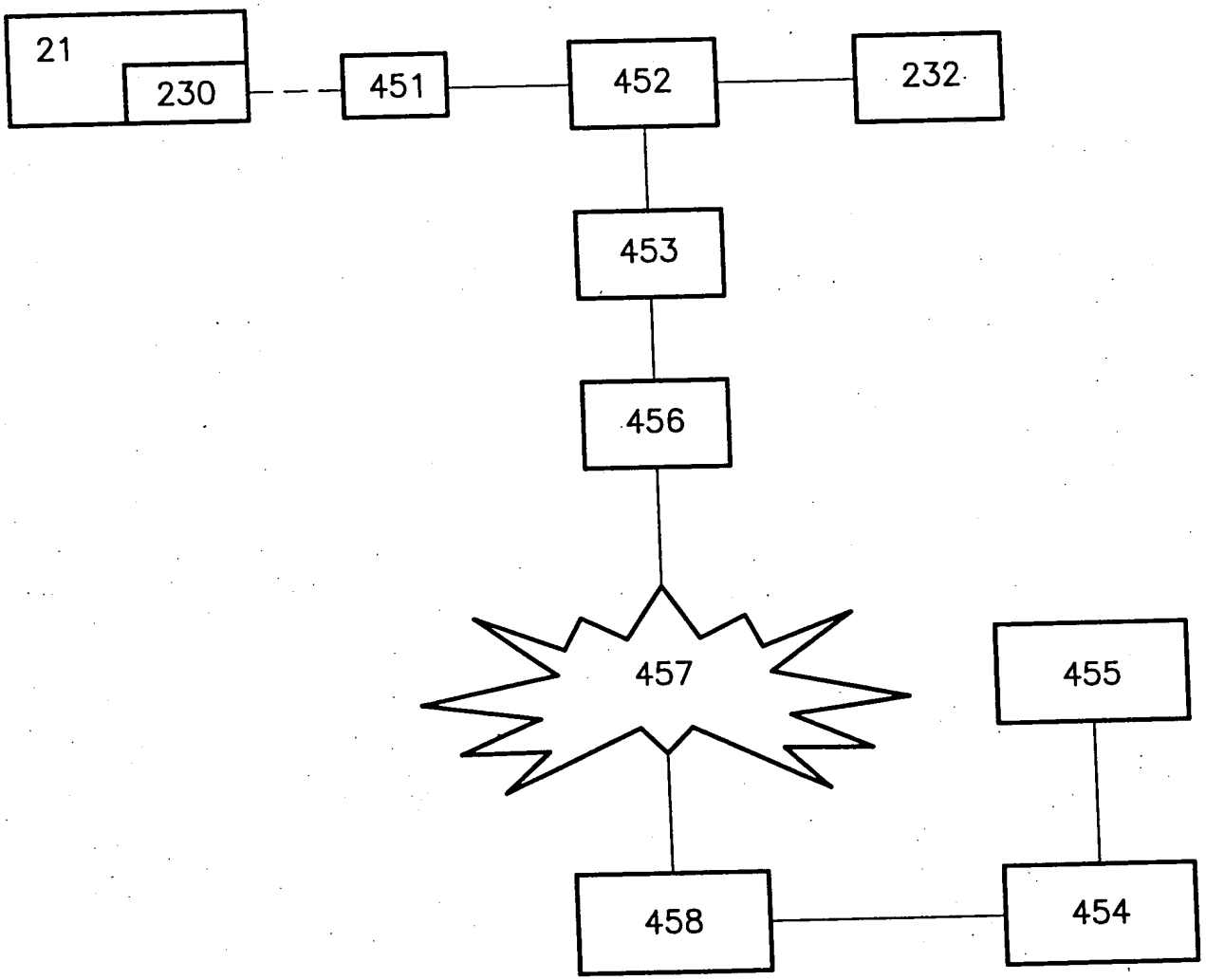


Fig. 29

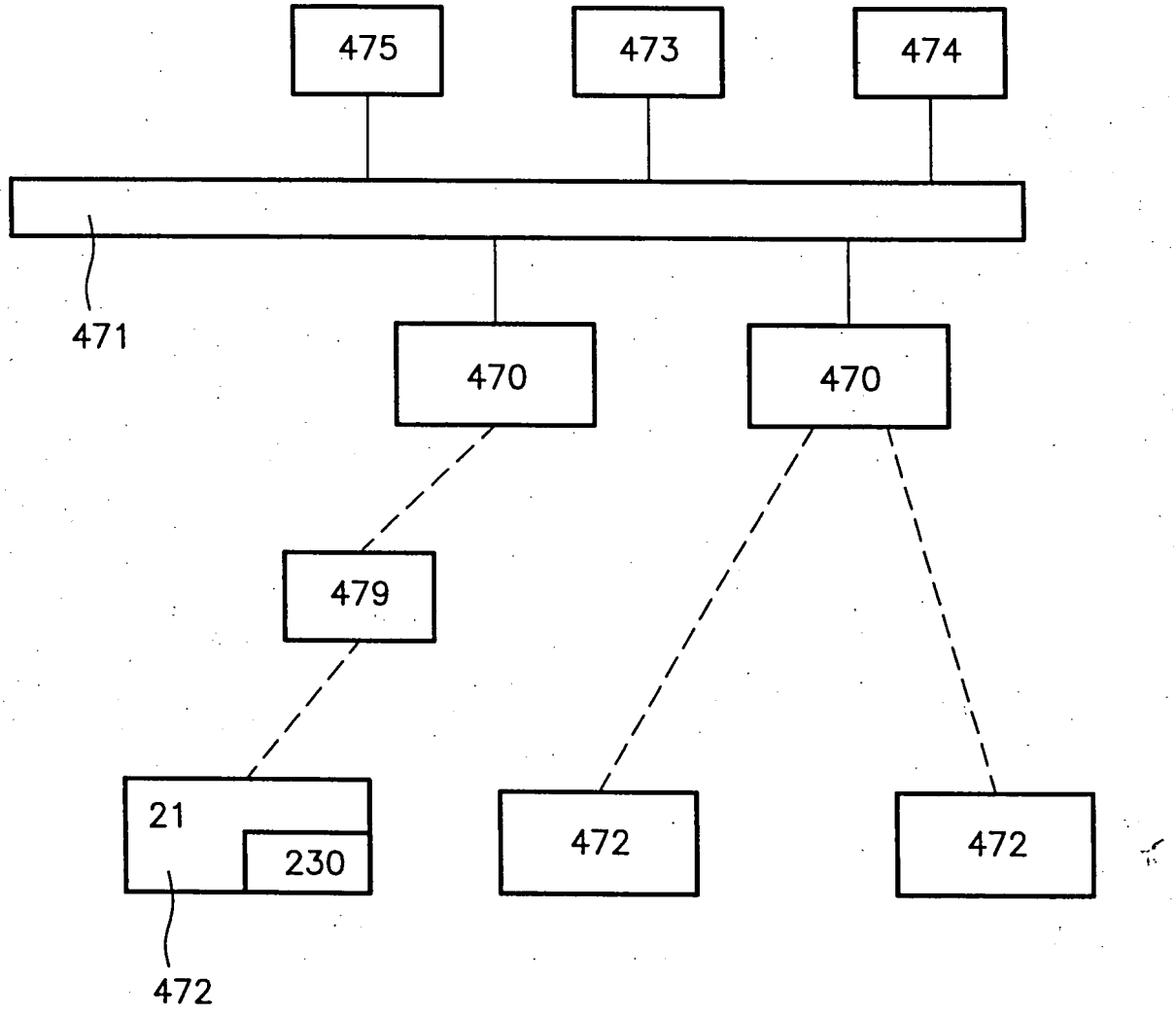


Fig. 30

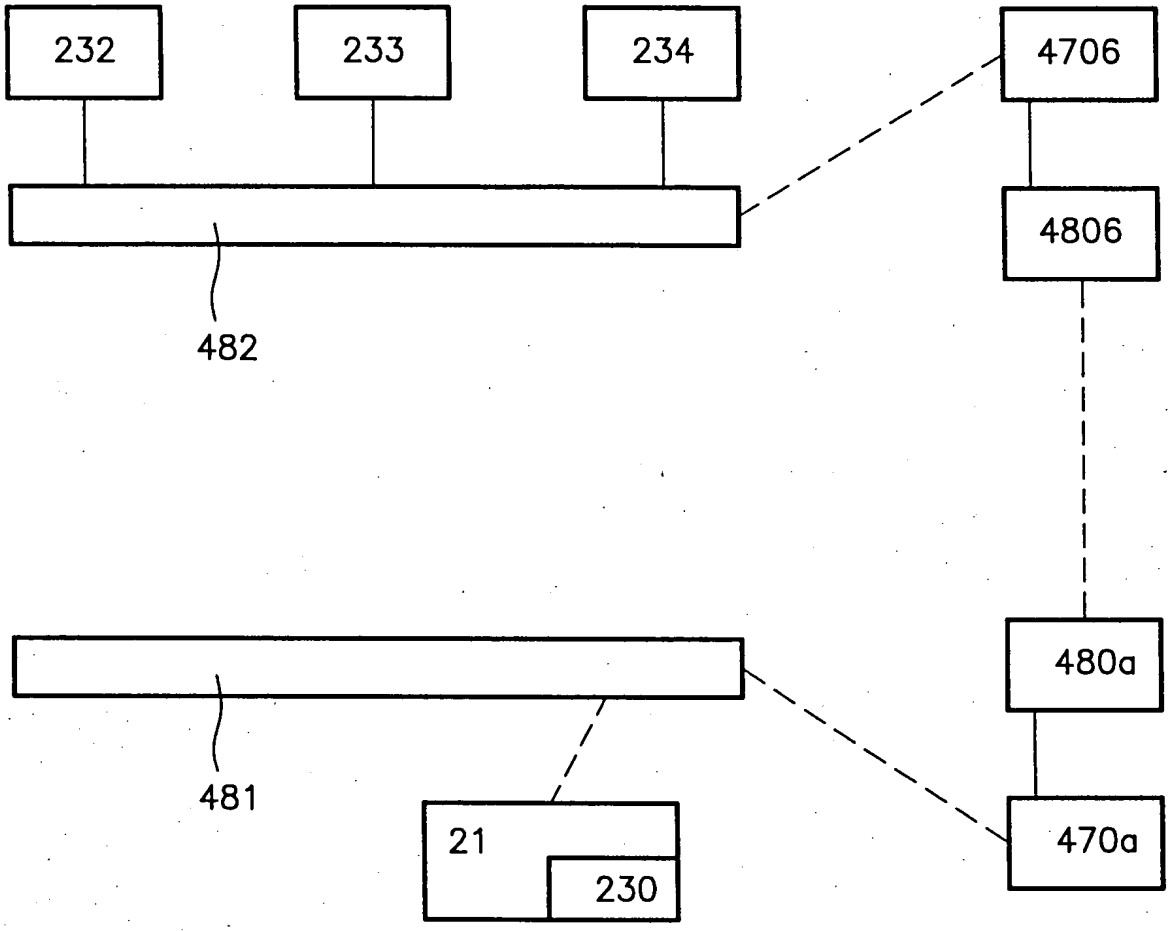


Fig. 31

Fig. 32

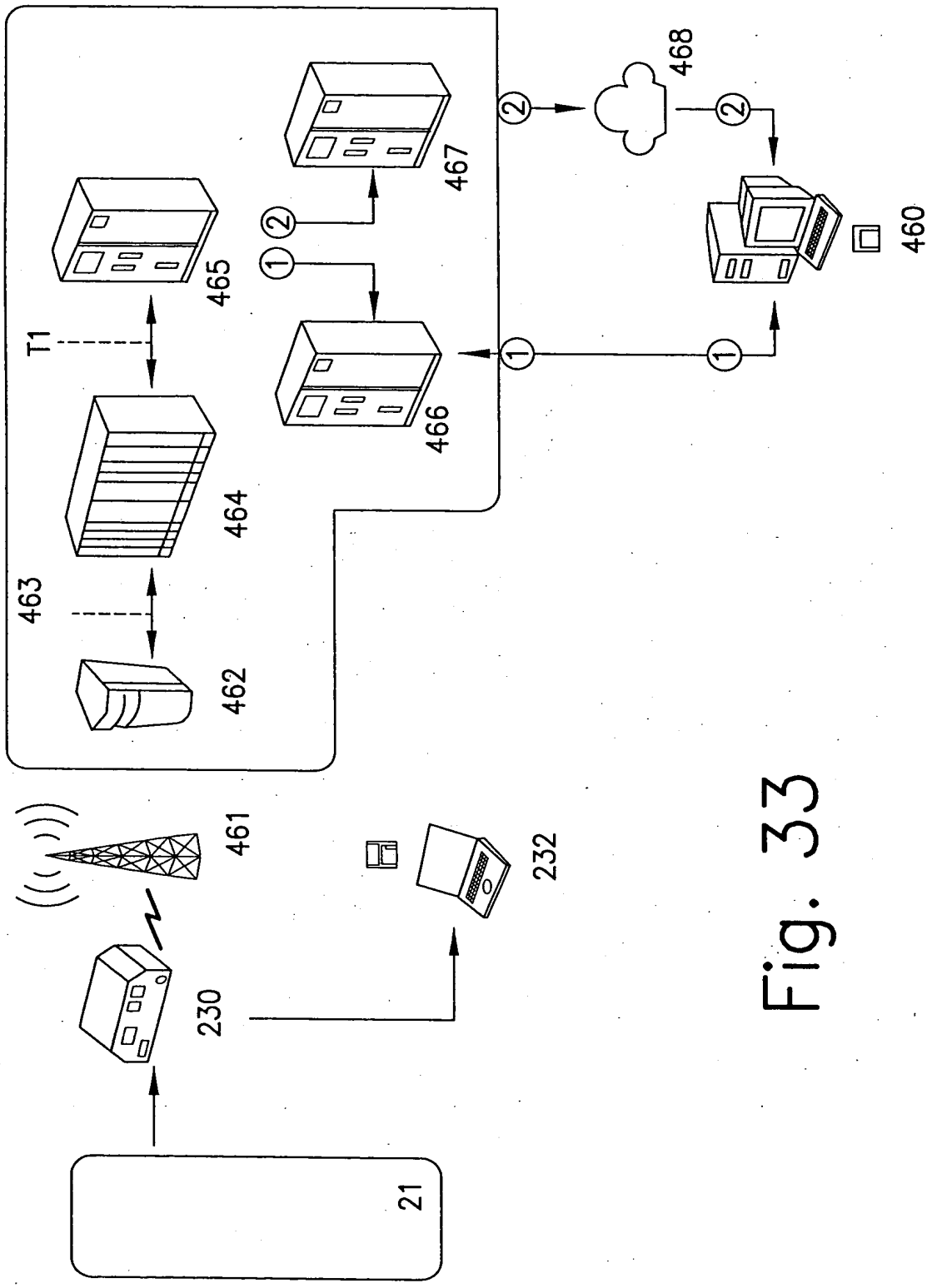


Fig. 33

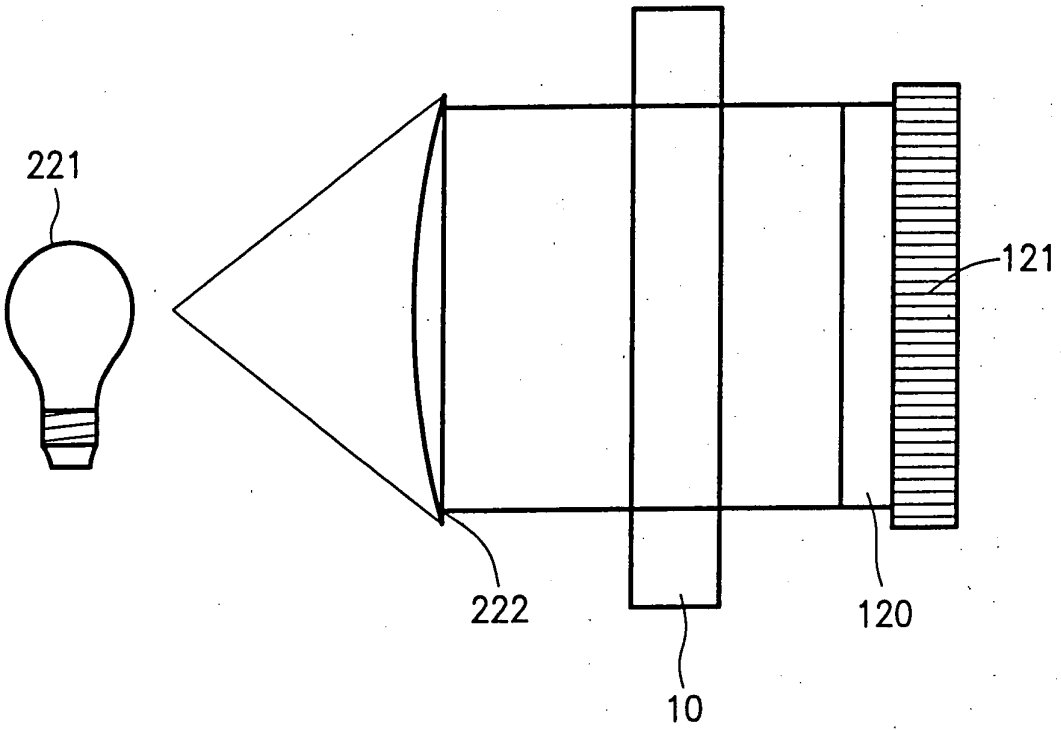


Fig. 34a

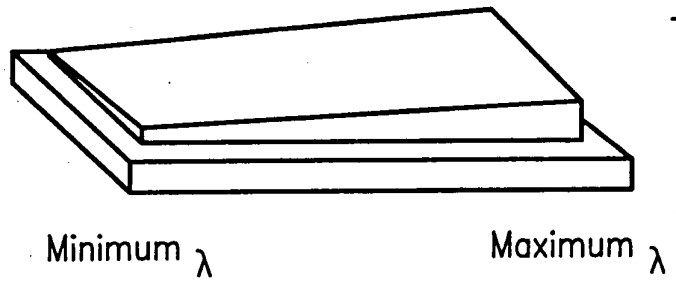


Fig. 34b

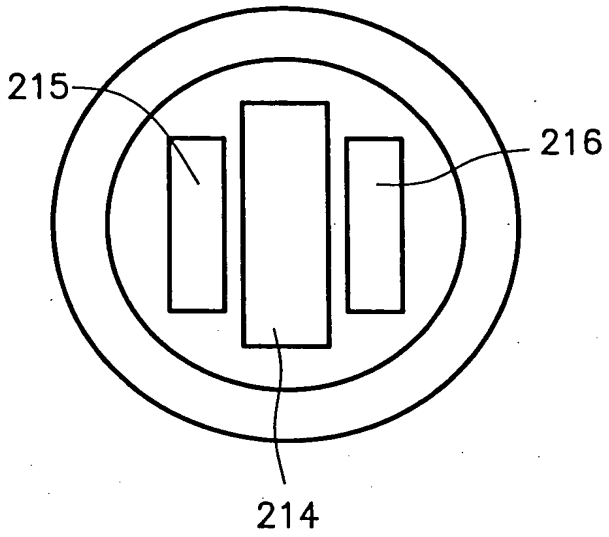


Fig. 35a

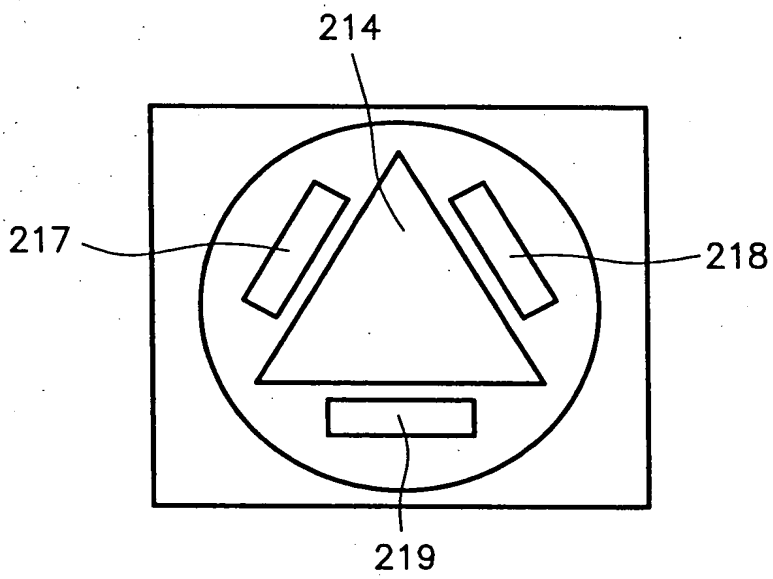
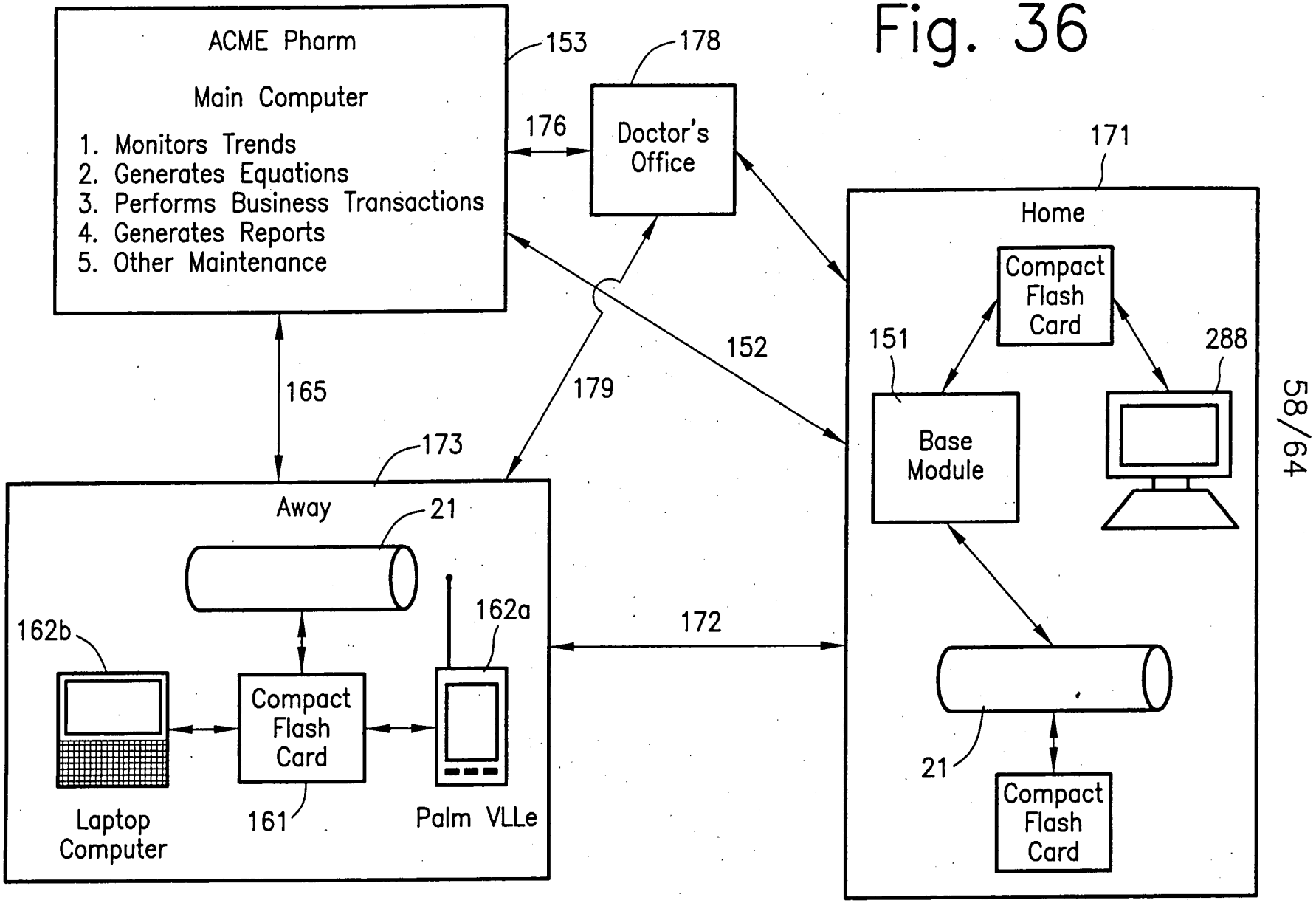


Fig. 35b

Fig. 36


ACME Pharm
Main Computer
1. Monitors Trends
2. Generates Equations
3. Performs Business Transactions
4. Generates Reports
5. Other Maintenance
153
178
176
Doctor's Office
171
Home
Compact Flash Card
151
288
152
165
179
Base Module
173
Away
21
162a
162b
172
Compact Flash Card
Laptop Computer
161
Palm VLLe
21
Compact Flash Card
58/64

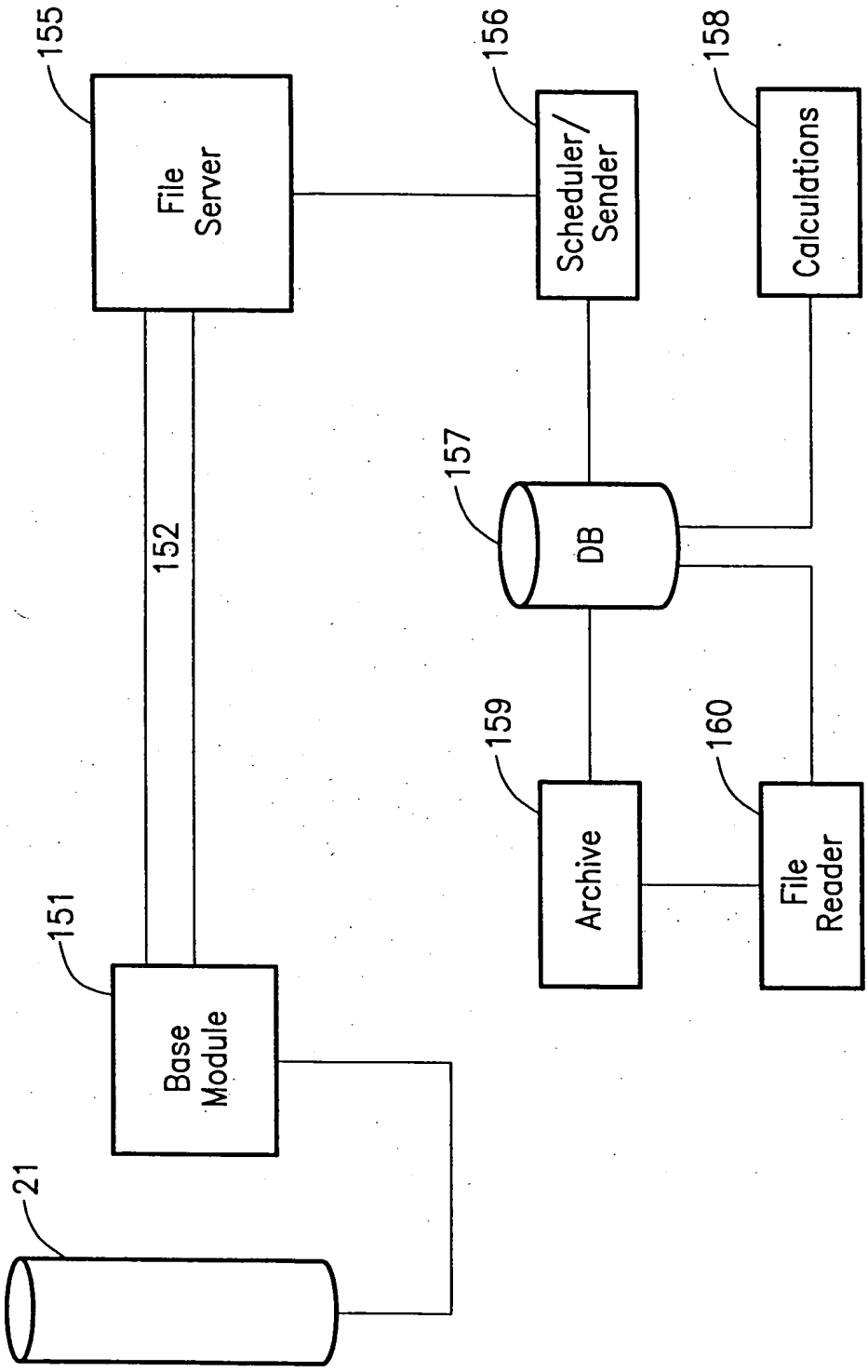

155
File Server
156
Scheduler/ Sender
158
Calculations
157
DB
152
159
Archive
160
File Reader
151
Base Module
21

Fig. 37

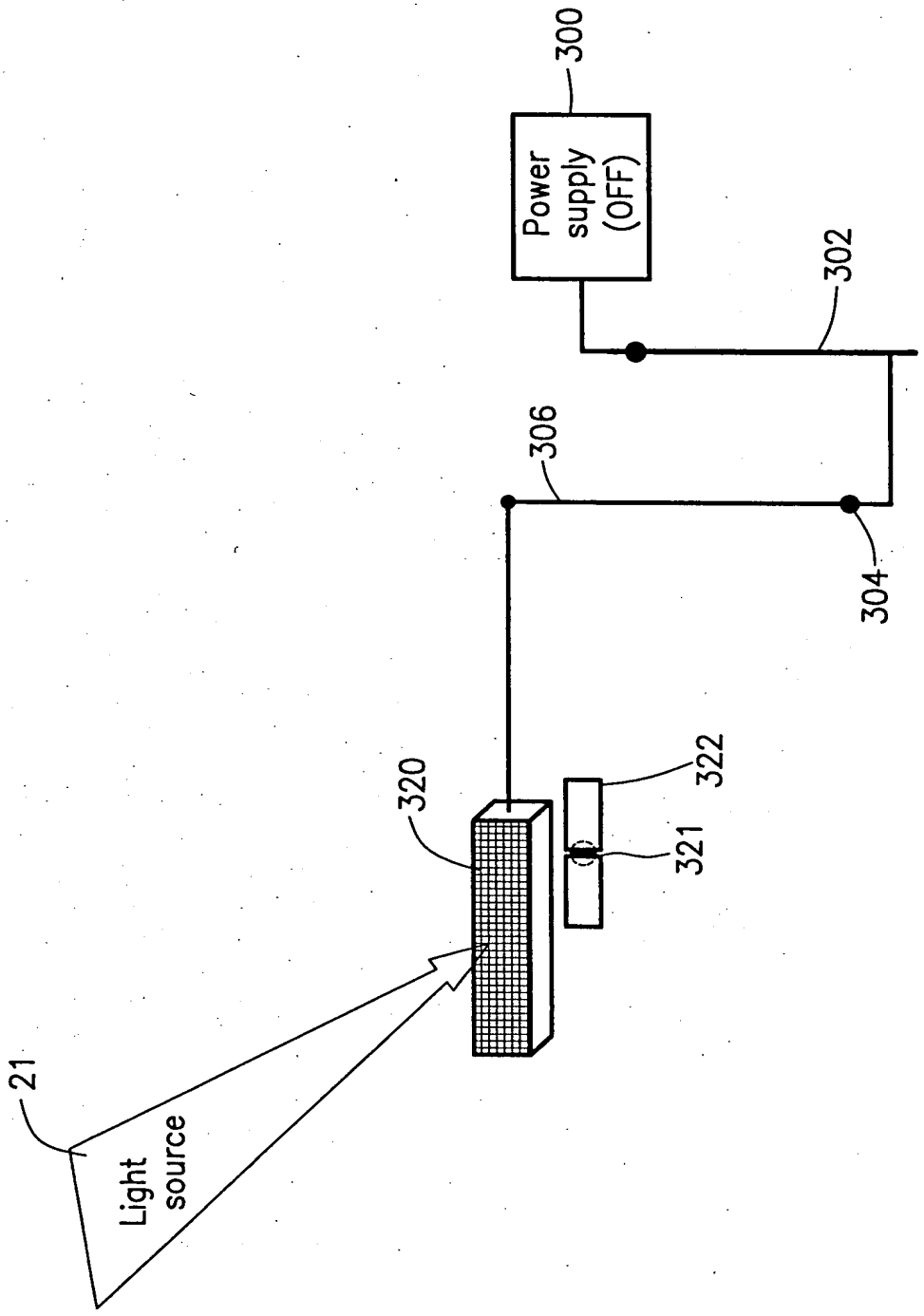


Fig. 38a

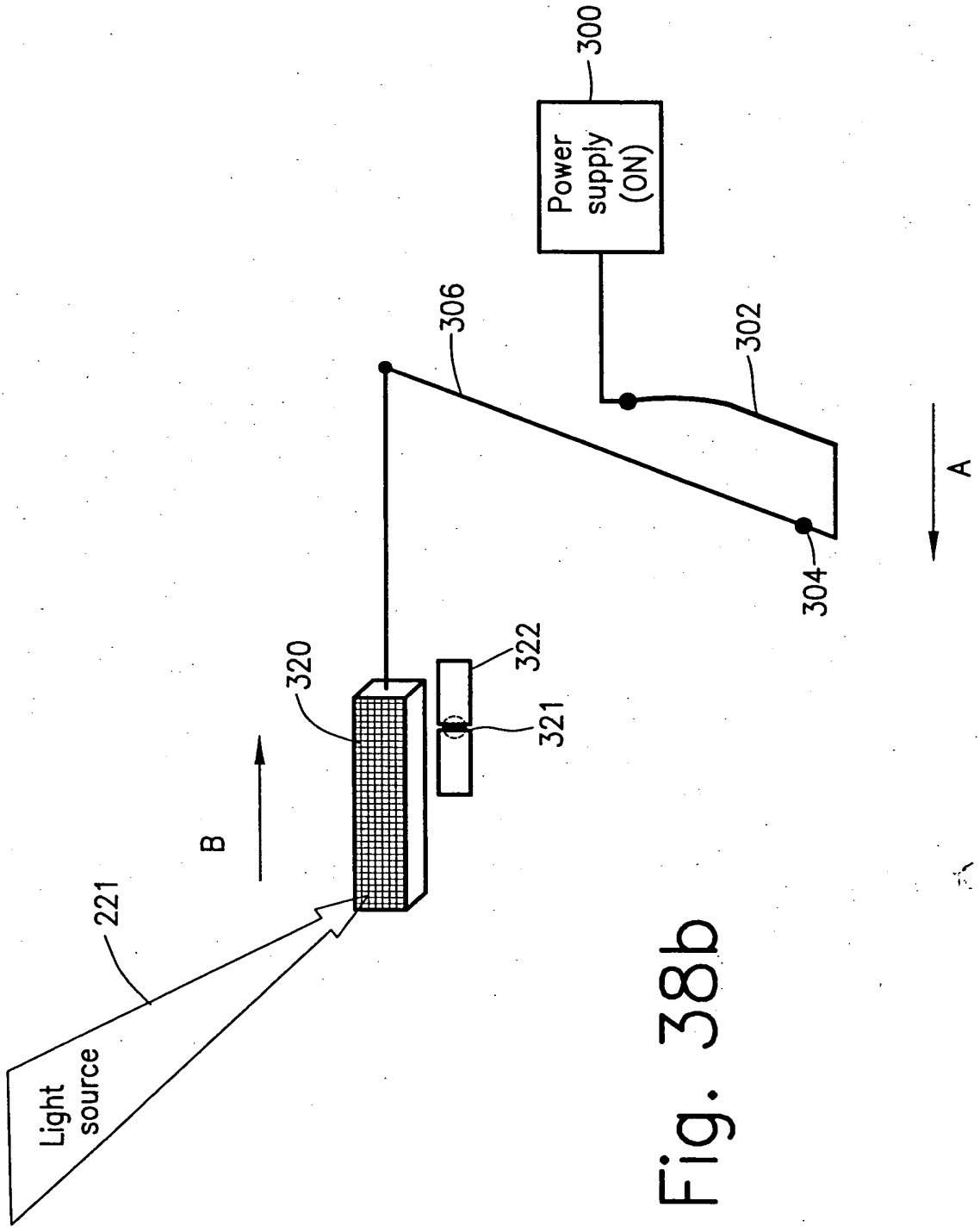

300
Power supply (ON)
306
302
304
A
322
320
321
B
221
Light source

Fig. 38b

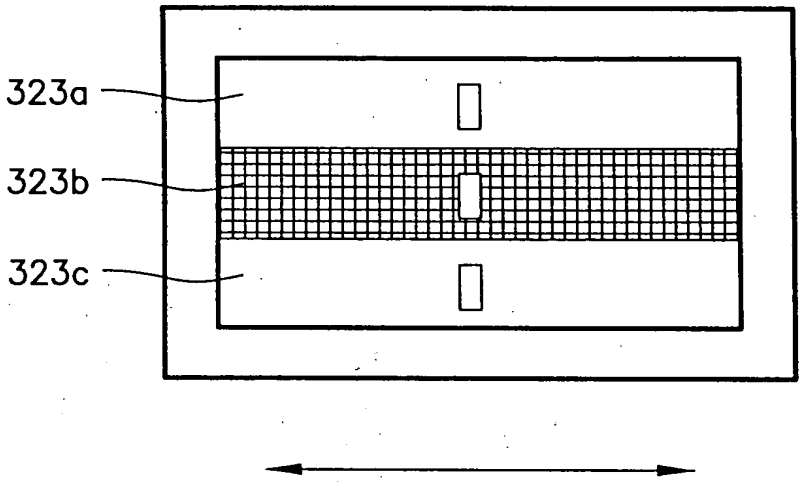


Fig. 39a

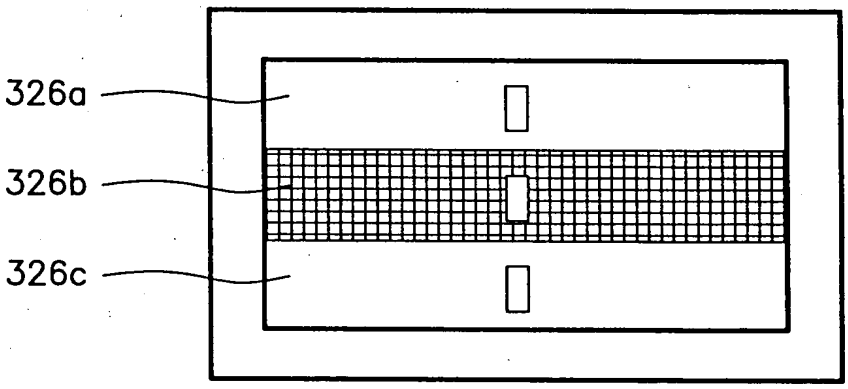


Fig. 39b

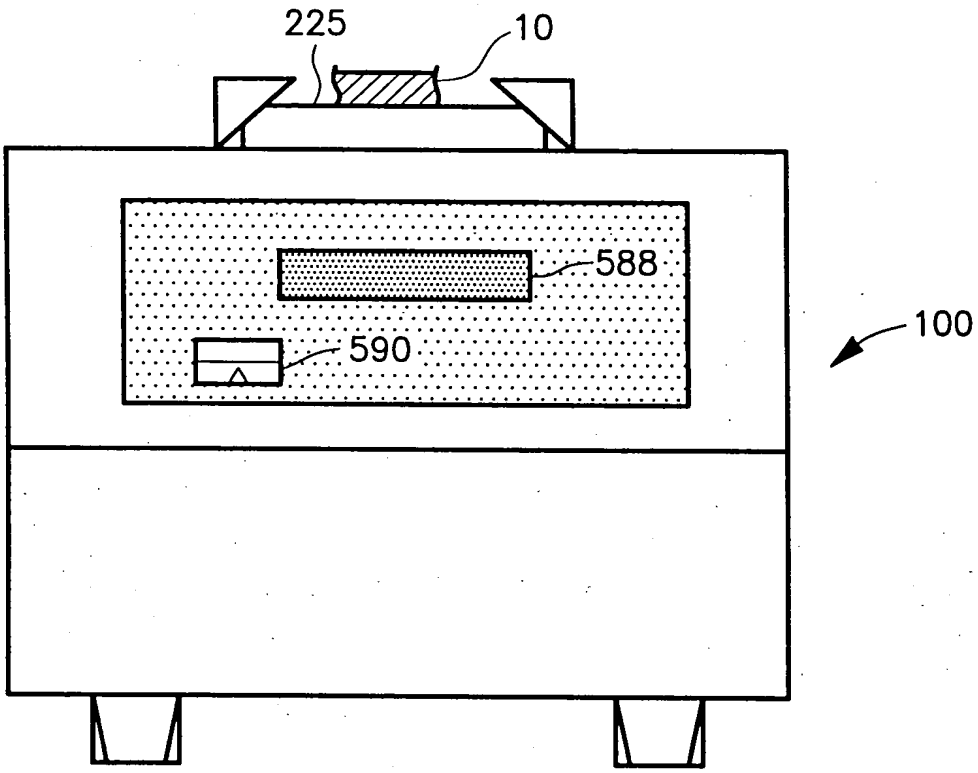


Fig. 40A

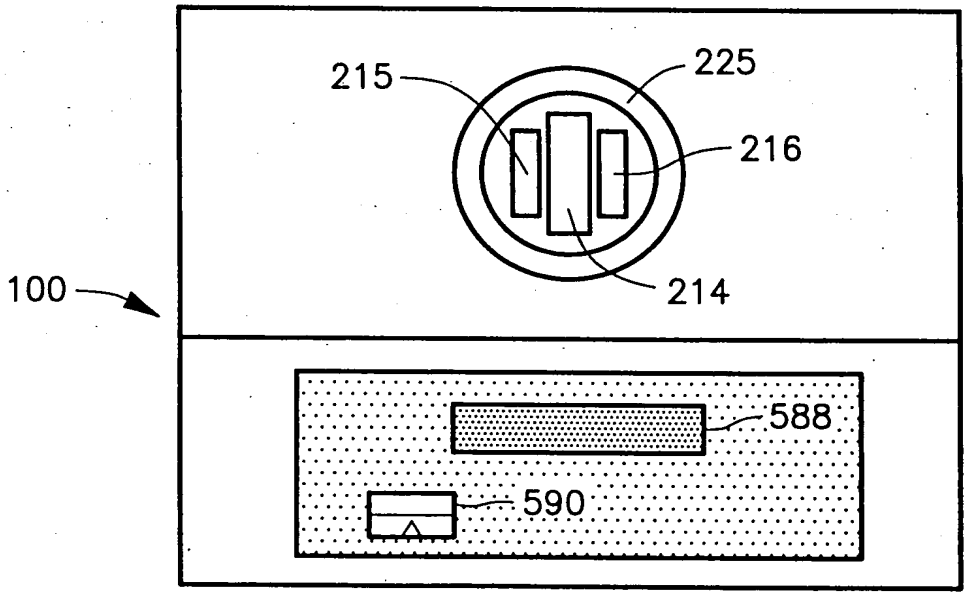


Fig. 40B

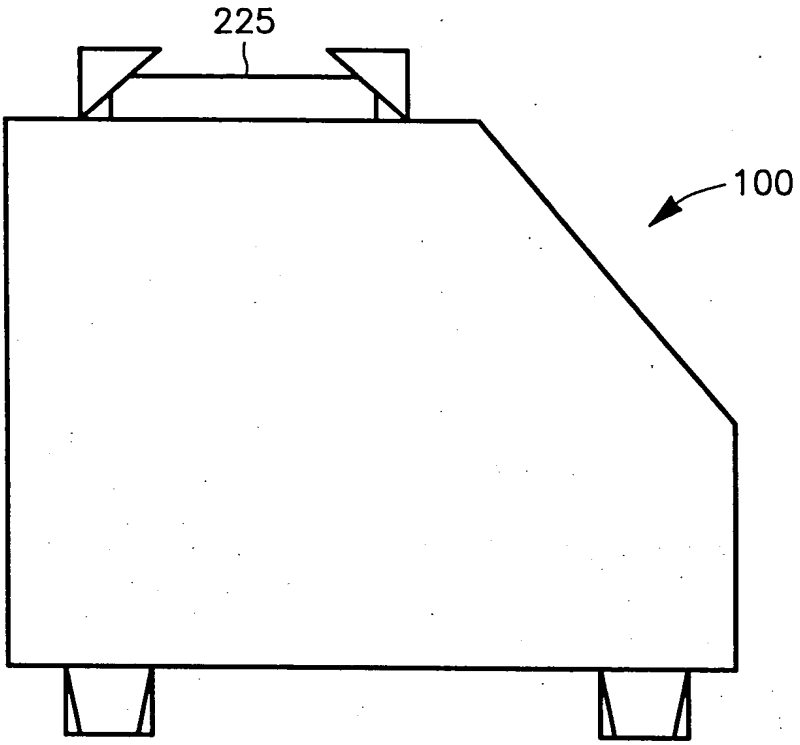


Fig. 40C

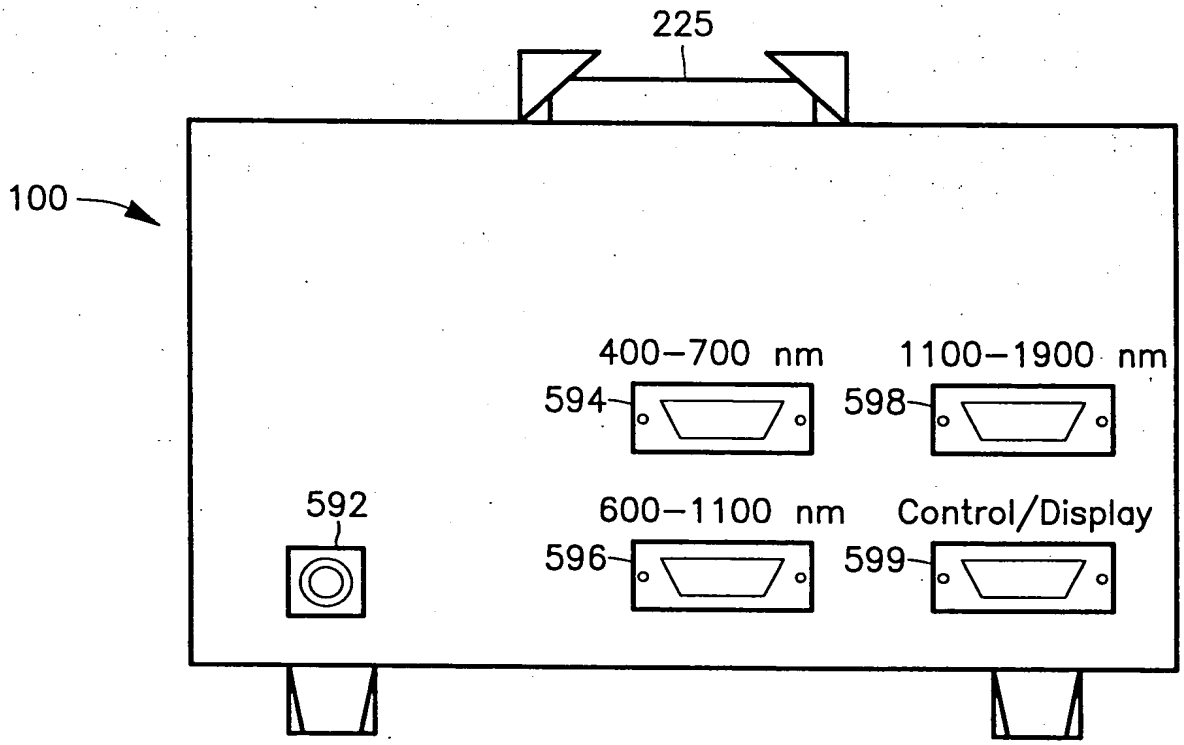


Fig. 40D